

**EXHIBIT 1**  
[UNREDACTED VERSION OF  
DOCUMENT SOUGHT TO BE SEALED]

# Grenada SBS SAD Final 4/28/11

Grenada Core Team  
Seagate Technology



Case 2:16-cv-00523-JCS Document 155-1 Filed 01/12/18 Page 3 of 55

# Grenada SBS SAD LCO DC

Product Name: Grenada

Approval Date: April 27, 2011

Design Center: LCO

Goal: Authorizes SAD Shipments to SBS; Q4'11 forward

Volume Factory: Korat

Configuration: 1TB, 2TB, 3TB SATA

## Design Center Approval:

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# SBS Ship Approval

Product Name: Grenada Approval Date: 4/27/2011  
 Design Center: LCO Goal: Commence SBS Shipments  
 Volume Factory: Korat Configuration: 1TB, 2TB, 3TB

	CRITERIA		EXCEPTIONS/ STATUS			MET?	
1a	<b>Integration DPPM Goal Achieved</b> <i>Demo ≤ 8,000 dppm</i>	<b>DEMO</b>	<b>RAW</b>	<b>DEMO</b>	<b>PROJ.</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
		≤ 8k DPPM		6.8K	N/A		
1b	<b>168-Hr DPPM Goal Achieved</b> <i>Demo ≤ dppm</i>	<b>DEMO</b>	<b>RAW</b>	<b>DEMO</b>	<b>PROJ.</b>	N/A	
		N/A DPPM					
2	<b>MTBF Goal Achieved</b> <i>Demo ≥ 100 k hrs</i>	<b>DEMO</b>	<b>RAW</b>	<b>DEMO</b>	<b>PROJ.</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
		≥ 100k Hrs		101K	167K		
SBS Mini RDT completed/fit for use							
3	<b>Gen 2/3 Product Assurance and Factory Testing Complete</b> - SBS DMT testing and Reliability subset of drive DMT testing		In progress of Regressing 1D packaging test with proper packaging, low risk			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
4	<b>Firmware/Compatibility Testing Complete</b> - SBS firmware and compatibility completed/fit for use and All High Risk items fix validated.					<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
5	<b>Factory Prime Yields meet Phase 0 goals</b>		Product Yields 1D: 76.8n, 2D: 67.8c, 73.2n 3D: 56.6n			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
6	<b>Process Readiness Audit and Process Verification Test Results approved by Volume Factory and Design Center.</b> - Includes QA Hardware/Software Readiness and SBS approval					<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
7	<b>Component sources defined on the SSP approved to ASL level AE/AB. Exceptions have defined/underpinned closure plans. Qualified Sources can support Master Schedule Requirements.</b>		1.			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
8	<b>Product Stewardship Declaration of Compliance has been issued per Corporate Product Stewardship Certification Process.</b>		1.			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
9	<b>Inventory / Material Disposition</b> - Complete roll-up of all Factory and DC pre-SAD config inventory/WIP/FG and Disposition.		1			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
10	<b>All other exceptions to the CTU Ship Approval Document have been closed.</b>		Korean Certification . Not a gate for SBS.			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
11	<b>Complexity Health Index</b> - Does not deviate from Phase 0 Contract		A. CH Index Score = 296 B. CC Budget = 80			<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

Applies to Rockit SBS Product, others in progress!





# Grenada Executive Summary

## Drive Development Phase: GEN2

Milestone	Phase 0	Gen 1	Gen2	SBS	CTU	Disty	OEM
Outlook	3/24/2010	10/26/2010	3/18/2011	4/29/2011	6/15/2011	6/15/2011	7/30/2011
Phase 0 Con	4/14/2010	9/2/2010	12/15/2010	4/10/2011	5/10/2011	5/10/2011	7/30/2011


MS1106-A1	Q4'11 Total	Q1'112Total	Q2'12 Total
GRENADA 1TB	110,830	1,101,543	3,342,524
GRENADA 1.5TB	0	68,305	132,236
GRENADA 2TB	124,589	1,044,879	2,920,364
GRENADA 2.5TB	0	0	0
GRENADA 3TB	79,995	135,273	618,414
GRENADA Total	315,414	2,350,000	7,013,538

### Key Message:

Added 692 drives (Mat2.0) with CA's in PC0 8.1 and at a average of 433 hours. Key learning from this regression will be the reduction of degraded readers and new media defects. Currently demo 101KMTBF and potential of 167K. Mat2.0 by itself is demo of 99K and 251K potential MTBF. DPPM currently at 6808 average

Based on the meeting the SBS SAD metrics, I will present package to SMT for SAD approval.

Restarted build of MPT suspensions and HGA builds for Grenada/Bacall and some early mass production.

**Engineering:**  mode in the Mat2.0 bed from Prism/Zest feature, flashed up the entire bed to new servo code with fix,

47KHz work in progress. DETCR disable not a major contributor, clearance hump testing regressing and SWD adjust work. 47KHz modulated writes strongly influenced by altitude and low skew clearance settings, failing HGA's sent to RHO for root cause and CA's. RHO has recreated the problem and working with MPT to define CA's. TDK version is very quiet in this frequency range and NHK testing in progress.

~~Released new EAW test specs and investigating chunk qual result wafer failure criteria.~~

### Reli Metrics:

Krishnan is working Native and BTC HGA specs and S5+ multi disc drive yields, yield update in package.

BLODT – Gen2 Demo/Regress and SBS Reli drives demo to 6.8K DPPM, early mass production qty 1.2K yielded 4.2K

~~TVM – 1D 2D and 3D's pass TVM at ~93%~~

### Challenges:

RDT – MTBF Demo at 101K with Mat 1.2/1.3 plus Mat2.0 regression drives.  
Manage new feature integration, get ready for RDT!

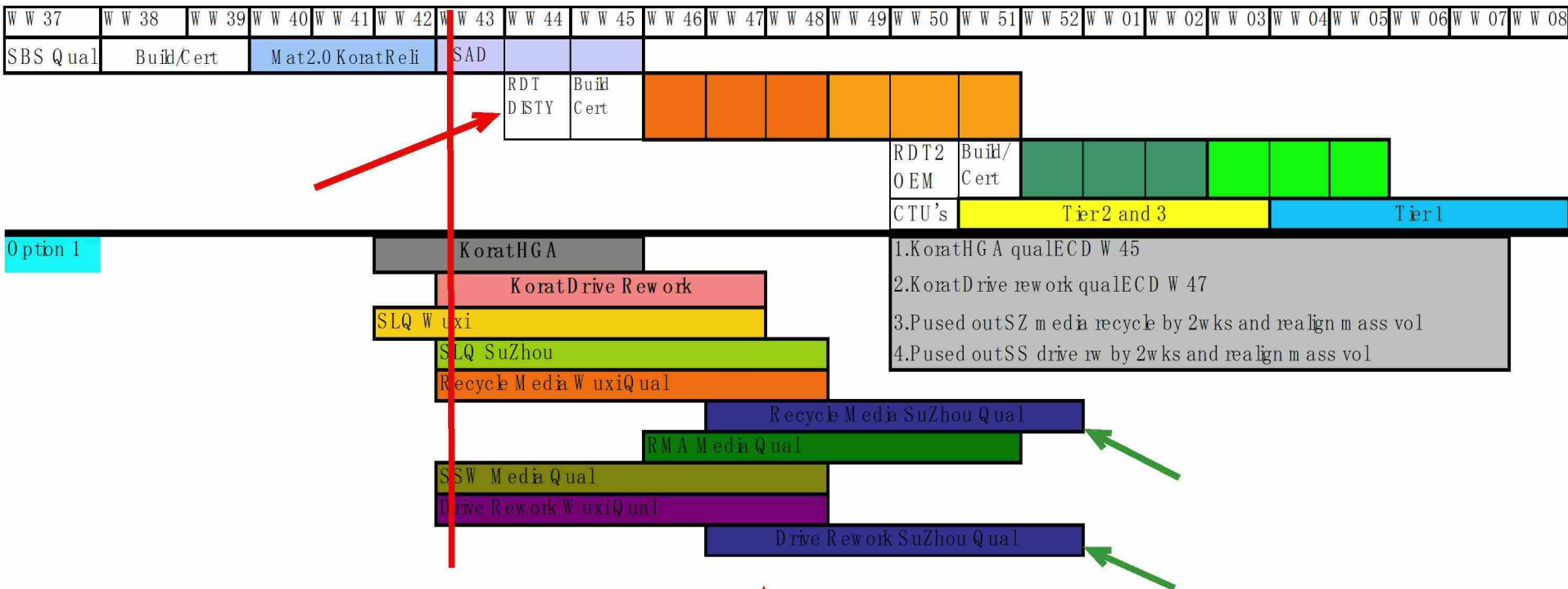
Grow MTBF and reduce DPPM quickly!



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# Grenada – Time Line



Disty RDT, supporting PCO at risk to push to WW45.↑

- Bottom Depop HD0 support, will also support the any head electrical depop functionality.

SuZhou Drive RW, and Recycle Media, Quals move out 2 weeks.↑

Drive rework .... Reli update pending.

Media recycle ..... 9 failures pending FA, CA.

SSW Media qual inclusive to Mechanical Depop qualification currently in Disty RDT.

GHG qualification ..... 3 Leg evaluation started, Reliability requirements pending, RGA and ODT.





# Reliability



04/27/2011

## Metric Highlights

### DPPM:

•7 Day MAV

Korat	Wuxi	Suzhou	Demo
NA	NA	NA	6.8k

•Goal:

Gen2	SBS	CTU	SAD	Vol.
20k	8k	4k	2k	500

### MTBF:

•Demo:

Validated	Potential
101k	167k

•Goal:

Gen 2:	SBS SAD	SAD
50k	100k	250k

### TVM:

Pass Rate	Gen2 Goal:
92%	90%

## Next Phase Gate/Schedule

Milestone	Date
SBS SAD	TBD

## Top Issues

### MAT 2.0

- 1x Unclassified IOEDC/IOECC Failure
- 1x Head Instability Failure

### SBS Box Testing - Raptor

- Thermal Limit Exceeded – 11C over spec
- 2x Op-Table Drop Failures – Drives in FA

### DMT

- 3 Disk Failure for Z-Height Dimension
- Regression of Package Testing
- Korean Cert

## FA / Issue Summary

### Open PFLs

Total	< 7 Days	7-15 Days	15-21 Days	21-28 Days	> 28 Days
134	44	24	23	11	32

### Issues

Total	Open	CA Imp.	CA Ver.	Unresolved
70	13	33	24	0

### SSO:

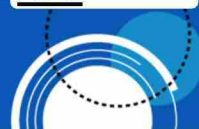
•None

### DA:

•None

## Near-term Schedule

- RDT 1 Testbed – tbd
- 10k MDW Qual – ww 44





## MAT 1.2/1.3/BtC/2.0

Updated: 4/27/11 12:00 AM

AFR (1st year Weibull)	7.006%	From all fails Weibull MLE	1651	Qty
MTBF (1st year Weibull)	33040.3			
Minimum AFR:	0.032%	From zero fail Weibull @ 50% CL	2400	POH/Year
Total Number of Failures	129		0.608098	Weibull Beta
AFR for 1 failure	0.054%	AFR decrease per failure @ 100% fix effectiveness	740	Average Test Hours

Issue	Corrective Action	Fix Validation	# of Failures	% Fail	Eff. Factors		Reduced AFR		PFL/TF
					Demo'd	Potential	Demo'd	Potential	
SPPL-043: Head Instability MAT1.2/1.3	Reducing the number of zones tested in T135 Increasing the minimum skew angle by moding ID zones out We are using IPD2 and only IPD3 on global ret.	Validation based on MAT 1.2/1.3/BtC failure rate in first 180 hours vs. MAT 2.0	23	1.243%	74%	90%	6.086%	5.887%	PFL-0701/879, PFL-0457/703, PFL-0304/443, PFL-0624/705, PFL-0674/667, PFL-0472/420, PFL-0617/669, PFL-0499/484, PFL-0491/497, PFL-0655/765, PFL-0451/371, PFL-0420/272, PFL-0355/83, PFL-0374/130, PFL-0373/94, PFL-0602/777, PFL-0645/747, PFL-0277/779, PFL-0388/515, PFL-0340/445, PFL-0262/110, PFL-0339/441, PFL-0283/112
SPPL-063: Encroachment due to ZEST/ATS	xx5C Servo Code to fix the bug: variable i32_SseekDestinationCylinderLogical which we use to decide if we are in the system area or not, is not getting updated by ATS seeks.	Validation of 11 failures in Korat with new servo code. Additionally 400 drives loaded in LCO with new servo code. 0 Failures	12	0.649%	100%	100%	6.358%	6.358%	PFL-0846/90, PFL-0863/146, PFL-0826/89, PFL-0836/125, PFL-0824/56, PFL-0825/55, PFL-0823/56, PFL-0862/54, PFL-0855/78, PFL-0811/16, PFL-0864/171, PFL-0348/126
SPPL-041: Sequencer Halt - MAT1.2/1.3	FE_0121416_212104_MAKE_ALL_RETRIES_BE_RETRYABLE Cut into AA5200 Cod	No Failures in 5200+ Code in Reli testing. SIE has reported problem fixed in their lab.	10	0.541%	100%	100%	6.466%	6.466%	PFL-0702/459, PFL-0710/946, PFL-0671/834, PFL-0668/233, PFL-0500/428, PFL-0578/788, PFL-0637/727, PFL-0351/50, PFL-0319/351, PFL-0306/318
SPPL-042: Missed Defect MAT1.2/1.3	3.5T Flawscan Odd/Even Flawscan SERV Recove	Validated on bench that failures are caught with 3.5T. Not detectable with current Flawscan.	10	0.541%	80%	80%	6.574%	6.574%	PFL-0383/226, PFL-0620/605, PFL-0504/574, PFL-0644/753, PFL-0419/276, PFL-0302/34, PFL-0336/39, PFL-0352/81, PFL-0385/200, PFL-0271/19
SPPL-044: New Defect MAT 1.2/1.3	Import Particle Sweep MQM from MantaRay. ECD 2/28	Validation based on MAT 1.2/1.3/BtC failure rate in first 180 hours vs. MAT 2.0	9	0.487%	20%	40%	6.909%	6.812%	PFL-0669/861, PFL-0496/441, PFL-0433/371, PFL-0370/159, PFL-0278/90, PFL-0310/68, PFL-0316/73, PFL-0206/212, PFL-0354/426
SPPL-051: BERP Retry Bug MAT1.2/1.3	AA6900 F3 Code	Validation on all failures flashed with AA6900 Code.	7	0.378%	80%	80%	6.704%	6.704%	PFL-0501/791, PFL-0677/893, PFL-0335/24, PFL-0421/310, PFL-0337/26, PFL-0397/252, PFL-0392/273
SPPL-045: Offtrack/Encroachment due to MDW DC Squeeze	PRIZM/ZEST to be implemented in PCO 008	Validation in Process on PFLs 317, 353, and 390 that were processed with PCO-008. Currently at 168 hours. 75% FE @ 185 hours	6	0.324%	80%	80%	6.747%	6.747%	PFL-0600/573, PFL-0651/732, PFL-0470/408, PFL-0317/882, PFL-0353/473, PFL-0390/237
SPPL-061: 47kHz Modulation - Gimble Yaw Mode	Moved MD contact detect zones to higher skew Increased revolutions at low skew zones (from 30 to 50) to improve contact detect SNR Optimized AGC detector for Luxor 2 compatibility Reduced FFT frequency binning to accommodate servo sample rate/ gimbal mode overl	Failure rate of 47kHz Mode on all Pre MAT 2.0 PCOs vs. MAT 2.0 PCO drives	6	0.324%	50%	67%	6.844%	6.789%	PFL-0716/1000, PFL-0720/1000, PFL-0714/1000, PFL-0715/1000, PFL-0718/1000, PFL-0717/1000
SPPL-046: Skip Write MAT 1.2/1.3	AFS 5.2 implemented in PCO008	Validation with MAT 2.0 Testbed (no failures) vs MAT 1.2/1.3 testbed which had 5 failures.	5	0.270%	80%	80%	6.790%	6.790%	PFL-0519/522, PFL-0635/668, PFL-0304/208, PFL-0349/445, PFL-0394/273
SPPL-064: 20kHz Modulation - Suspension Sway Mode	Short Term: T180 Changes + Iris 4.5 Long Term: Iris 4.6 Change	Failures in MAT 2.0 show 2kHz modulation in addition to the 20kHz. This has an affect on servo loop stability and is a contributing factor to the 20kHz failures.	5	0.270%	20%	75%	6.952%	6.804%	PFL-0885/153, PFL-0883/241, PFL-0818/20, PFL-0821/16, PFL-0272/37

SPPL-039: Hard Errors Due To Ineffective DC Gap Recovery	Register Change: 0x1ac=0x79BF & 0x73=0x137 to set gap recovery after read instead of gap recovery after servo.	Validation of 9 total Grenada Bacall failures. 1 of 9 failures is not recoverable.	4	0.216%	79%	80%	6.835%	6.833%	PFL-0279102,PFL-0281115,PFL-0261914,PFL-0270114
SPPL-049: Burnt 5V Regulator due to Transient - Fairchild	Non Issue for SBS. Resistor value change (10 to 1ohm) for added margin. Gren02 PCBA being worked for Disty/OEM customers		4	0.216%	100%	100%	6.790%	6.790%	PFL-06221590,PFL-0273141,PFL-0274154,PFL-0357105
SPPL-068: SwDT - Iris 4.3 Suspensions	Iris 4.5 Gold PZT	All 20 SwDT failures in Grenada with Iris 4.3. Only 325 drives tested with Iris 4.5 to date.	4	0.216%	72%	80%	6.851%	6.833%	PFL-0819134,PFL-0827167,PFL-04451339,PFL-04921444
SPPL-047: Low OTF due to initial integration of BIE	Opti 18 implemented in PC0 008	Validation with MAT 2.0 testbed. No OTF dropout failures seen vs. 3 in Previous MAT 1.2/1.3 Testbed	3	0.162%	75%	75%	6.885%	6.885%	PFL-04251344,PFL-0371166,PFL-0372101
SPPL-065: Weak Write due to Clearance Settling - MAT 2.0	Fix issue with PC0 8 disabling the weak write screen VBAR by HMS Phase 3 implementation	Validation with these 3 failures sent back to the process to re-run weak write screen	3	0.162%	15%	60%	6.982%	6.909%	PFL-081210,PFL-081310,PFL-080510
SPPL-040: VBAR by HMS bug causing loss of TPI margin	PC0 007.2 Fix for VBAR/HMS bug that over/under reported capability	Validated with TVM data. 6/34 Failures in PC0 007 vs 0/90 in PC0 7.3	2	0.108%	80%	80%	6.920%	6.920%	PFL-05011450,PFL-0339126
SPPL-052: PZT due to physical to	Fixed in x53B servo code	Validated with x53B servo and later	2	0.108%	100%	100%	6.898%	6.898%	PFL-05021501,PFL-03561173
SPPL-073: EAW - MAT 2.0	PC0 8.6 - In checkout in factory. Cut in date ww44. (If DELTA_BER_CHUNK1 < 0.48 OR DELTA_BER_CHUNK3 < 0.3, then the Drive passes. Alternately, If DELTA_BER_CHUNK1 >= 0.48 AND DELTA_BER_CHUNK3 >= 0.3, then the Drive fails.		2	0.108%	62%	80%	6.939%	6.920%	PFL-08251307,PFL-0914165
SPPL-074: 47kHz Modulation - Gimble Yaw Mode - MAT 2.0	Short Term: DETCR Disabled in Runtime Long Term: Iris 4.8 Chang		2	0.108%	0%	50%	7.006%	6.952%	PFL-08341267,PFL-0845166
IOEDC Error	NANYA DDR - PART DQ'd		1	0.054%	0%	100%	7.006%	6.952%	PFL-09401329
SPPL-055: EAW/Pre Wafer Chunk Qual - Gen1	Wafer Chunk qual for EAW implemented ww38	Validation on failure rate between MAT 1.2/1.3/1.4 and MAT 2.0.	1	0.054%	50%	50%	6.979%	6.979%	PFL-0320113
SPPL-057: Write IOEDC error due to	Enable PROD_SID_FW_CLOCK_GATING flag to prevent a write IOEDC error.	PROD_SID_FW_CLOCK_GATING flag enabled in AA6F00 F3 code	1	0.054%	100%	100%	6.952%	6.952%	PFL-0623118
SPPL-067: Bad PES at Quarter Track Position & VCAT Peak	OCUM changes to T109 Change servo flow scan to map out areas as defects Target code release ww	Validating PFL 869 with test code EFDF in Korat.	1	0.054%	0%	90%	7.006%	6.958%	PFL-06041636
SPPL-069: Missed Defect - MAT 2.0	Implement full Odd/Even in DFS. Implementation date ww44		1	0.054%	0%	80%	7.006%	6.963%	PFL-0831154
SPPL-070: Failed to Spare Error -	Issue not repeatable in Reli or SIE. Pending fix		1	0.054%	0%	0%	7.006%	7.006%	PFL-06671706
SPPL-071: Head Instability - MAT 2.0	DETCR Off in Runtime. Implementation in PC0 9.0		1	0.054%	0%	0%	7.006%	7.006%	PFL-0822175
SPPL-072: Offtrack Write due to insufficient ZEST correction near system area	Remove ZEST Taper near the system tracks. #define TAPER_ZEST_NEAR_RESERVED_ZONE (1&& ENABLE_ZEST_DATA_OVERLAY) -> (0 && ENABLE_ZEST_DATA_OVERLAY) #define TAPER_ZEST_NEAR_TRACK0 (1&& ENABLE_ZEST_DATA_OVERLAY) -> (0 && ENABLE_ZEST_DATA_OVERLAY) Released Servo Code w		1	0.054%	0%	90%	7.006%	6.958%	PFL-08691229
Single Bit Miscompare	NANYA DDR - PART DQ'd		1	0.054%	0%	100%	7.006%	6.952%	PFL-10011420
Weak Write			1	0.054%	0%	0%	7.006%	7.006%	PFL-0303138
Total Number of Fails			129	Reduced AFR :			2.34%	1.43%	
				Corresponding MTBF :			101K	167K	



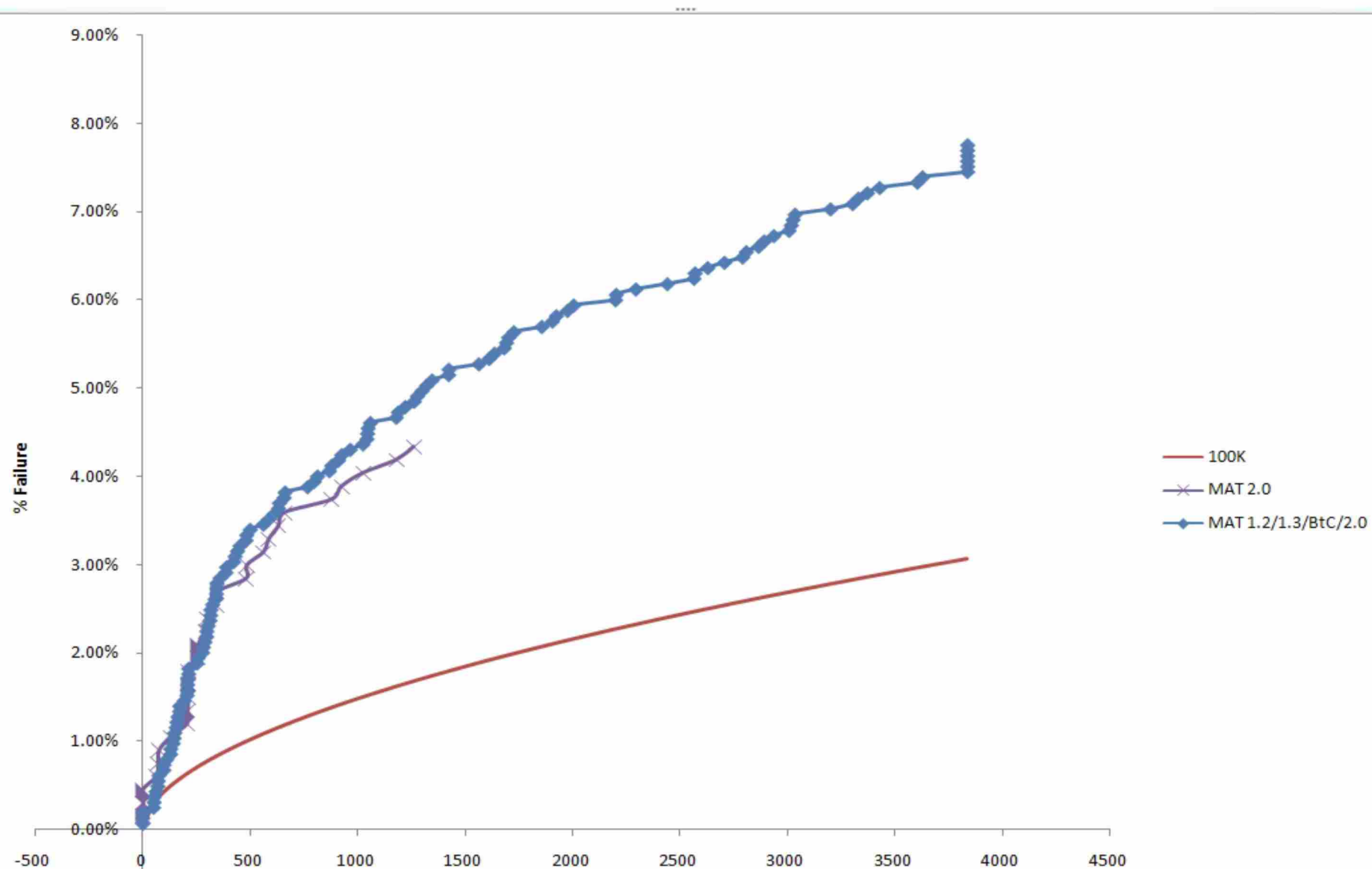


MAT 2.0				Updated: 4/27/11 12:00 AM	
AFR (1st year Weibull)	5.005%	From all fails Weibull MLE	670	Qty	
MTBF (1st year Weibull)	46739.2				
Minimum AFR:	0.080%	From zero fail Weibull @ 50% CL	2400	POH/Year	
Total Number of Failures	30		0.404653605	Weibull Beta	
AFR for 1 failure	0.164%	AFR decrease per failure @ 100% fix effectiveness	457	Average Test Hours	

Issue	Corrective Action	Fix Validation	# of Failures	% Fail	Eff. Factors		Reduced AFR		PFL/TTF
					Demo'd	Potential	Demo'd	Potential	
SPPL-063: Encroachment due to ZEST/ATS	xx5C Servo Code to fix the bug: variable i32_SeekDestinationCylinderLogical which we use to decide if we are in the system area or not, is not getting updated by ATS seeks.	Validation of T1 failures in Korat with new servo code. Additionally 400 drives loaded in LCO with new servo code. 0 Failures	12	1.970%	100%	100%	3.035%	3.035%	PFL-0846/90,PFL-0863/146,PFL-0826/89,PFL-0836/125,PFL-0824/56,PFL-0825/55,PFL-0823/56,PFL-0862/54,PFL-0855/78,PFL-0811/18,PFL-0864/171,PFL-0848/126
SPPL-064: 20kHz Modulation - Suspension Sway Mode	Short Term: T180 Changes + Iris 4.5 Long Term: Iris 4.6 Change	Failures in MAT 2.0 show 2kHz modulation in addition to the 20kHz. This has an affect on servo loop stability and is a contributing factor to the 20kHz failures.	4	0.657%	20%	75%	4.874%	4.513%	PFL-0885/153,PFL-0883/241,PFL-0818/20,PFL-0821/16
SPPL-065: Weak Write due to Clearance Settling - MAT 2.0	Fix issue with PCO 8 disabling the weak write screen VBAR by HMS Phase 3 implementation	Validation with these 3 failures sent back to the process to re-run weak write screen	3	0.493%	15%	60%	4.931%	4.710%	PFL-0812/0,PFL-0813/0,PFL-0805/0
SPPL-068: SWOT - Iris 4.3 Suspensions	Iris 4.5 Gold PZT	All 20 SWOT failures in Grenada with Iris 4.3. Only 325 drives tested with Iris 4.5 to date.	2	0.328%	72%	80%	4.769%	4.743%	PFL-0819/34,PFL-0827/67
SPPL-073: EAW - MAT 2.0	PCO 8.6 - In checkout in factory. Cut in date ww44. (If DELTA_BER_CHUNK1 < 0.48 OR DELTA_BER_CHUNK3 < 0.3, then the Drive passes. Alternately, If DELTA_BER_CHUNK1 >= 0.48 AND DELTA_BER_CHUNK3 >= 0.3, then the Drive fails.		2	0.328%	62%	80%	4.802%	4.743%	PFL-0925/307,PFL-0914/165
SPPL-074: 47kHz Modulation - Gimble Yaw Mode - MAT 2.0	Short Term: DETCR Disabled in Runtime Long Term: Iris 4.6 Chang		2	0.328%	0%	50%	5.005%	4.841%	PFL-0884/267,PFL-0845/66
IOEDC Error	NANYA DDR - PART DQ'd		1	0.164%	0%	100%	5.005%	4.841%	PFL-0940/329
SPPL-069: Missed Defect - MAT 2.0	Implement full Odd/Even in DFS. Implementation date ww44		1	0.164%	0%	80%	5.005%	4.874%	PFL-0831/54
SPPL-071: Head Instability - MAT 2.0	DETCR Off in Runtime. Implementation in PCO 9.0		1	0.164%	0%	0%	5.005%	5.005%	PFL-0822/75
SPPL-072: Offtrack Write due to insufficient ZEST correction near system area	Remove ZEST Taper near the system tracks. #define TAPER_ZEST_NEAR_RESERVED_ZONE (1 && ENABLE_ZEST_DATA_OVERLAY) -> (0 && ENABLE_ZEST_DATA_OVERLAY) #define TAPER_ZEST_NEAR_TRACK0 (1 && ENABLE_ZEST_DATA_OVERLAY) -> (0 && ENABLE_ZEST_DATA_OVERLAY) Released Servo Code w		1	0.164%	0%	90%	5.005%	4.858%	PFL-0869/229
Single Bit Miscompare	NANYA DDR - PART DQ'd		1	0.164%	0%	100%	5.005%	4.841%	PFL-1001/420
Total Number of Fails			30	Reduced AFR :		2.39%	0.95%		
				Corresponding MTBF :		99K	251K		





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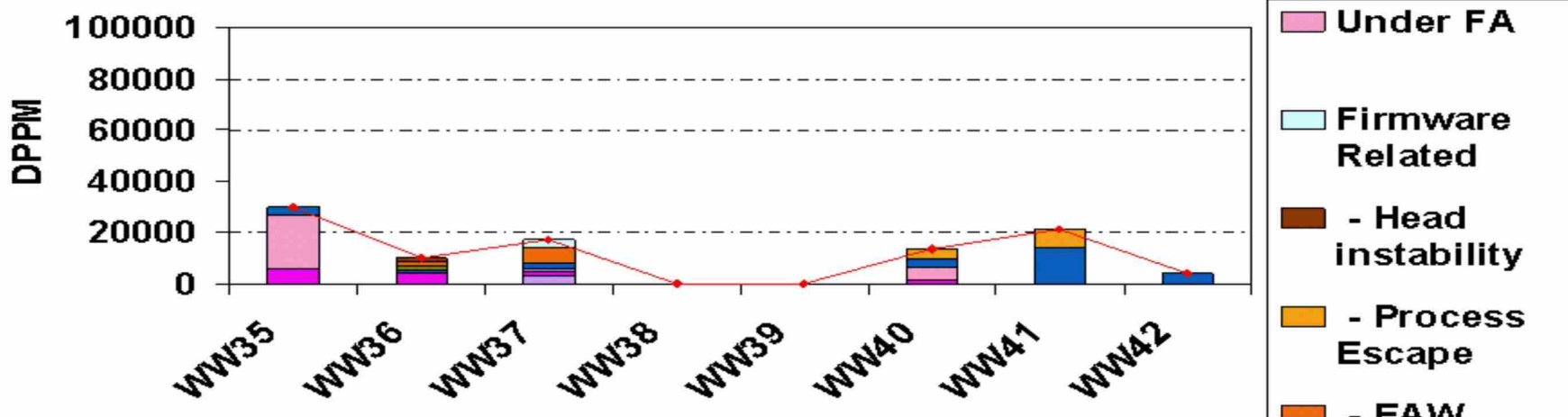
Page 11



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## Korat Grenada ODT Performance WW1142



Grenada	WW35	WW36	WW37	WW38	WW39	WW40	WW41	WW42
Q'ty Tested	335	705	634	90	0	737	140	1179
Q'ty Failed	10	7	11	0	0	10	3	5
DPPM	29851	9929	17350	0	#DIV/0!	13569	21429	4241
<b>HDD Related</b>								
- Skip write			3155					
- NMD	5970	4255	1577			1357		
- Abort write / Corrupt write			1577					
- Offtrack write								
- Weak write	20896					5427		
- Encroachment	2985	1418	1577			2714	14286	4241
- Erasure		1418						
- EAVV		1418	6309					
- DNR								
- Process Escape						4071	7143	
<b>Head Related</b>								
- Head Asym								
- Head instability		1418						
<b>Firmware Related</b>			3155					
<b>Under FA</b>								

WW 40-42 Combined DPPM Performance = 6809  
Excluding process escapes



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Page 12



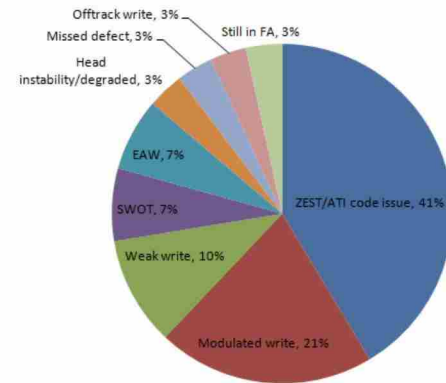
# Grenada Mat 2.0 Failure Pareto

WW43

## RDT / SBS

670 drives

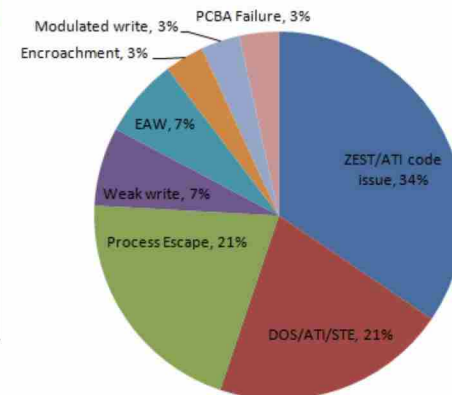
Pareto		Total	Corrective Actions	3D
ZEST/ATI code issue	41%	12	Fix validated w/ xx5C servo code.	12
Modulated write	21%	6	2x modulation at 47khz. 4x modulation at ~20khz; Working on T180 CA.	6
Weak write	10%	3	Weak write at OD zones. (screen mistakenly disabled in IOS2. Fixed)	3
SWOT	7%	2	First time we have SWOT on 6-hd. Suspect PZT, Iris 4.3 related.	2
EAW	7%	2	Chunk spec passer. Working T234 spec; RHO for additional FA.	2
Head instability/degraded	3%	1	More analysis in progress	1
Missed defect	3%	1	Developing DFS odd/even scans as CA.	1
Offtrack write	3%	1	Offtrack encroachment at head1, zone F.	1
Still in FA	3%	1		1
Total		29		29



## BODT

704 drives

Pareto		Total	Corrective Actions	3D
ZEST/ATI code issue	34%	10	Fix validated w/ xx5C servo code.	10
DOS/ATI/STE	21%	6	Suspect BIE DOS setting issue w/ BtC. Detail analysis in progress.	6
Process Escape	21%	6	4x CST2 EC11049 timeouts; 2x CUT2 G-P merge / slip list issue. Fixed	6
Weak write	7%	2	Weak write at OD zones. (screen mistakenly disabled in IOS2. Fixed)	2
EAW	7%	2	Chunk spec passer. Working T234 spec; RHO for additional FA.	2
Encroachment	3%	1	Odd head, OD zones. Suspect ZAP related.	1
Modulated write	3%	1	Modulation at ~20khz. Working on T180 CA.	1
PCBA Failure	3%	1	Bad LuxorL part, PLL2 timing issue. Working with LSI to resolve/screen.	1
Total		29		29



04/19/2011

## MAT 2.0

	Qty Failures	% Validated FE
ZEST/ATS	10	90%
ATI	6	75%
Process Escape	6	100%
Weak Write	2	0%
Defective Luxor	1	0%
20kHz Modualtion	1	0%

Total Failures 26  
Qty in Test 704

Raw DPPM	36932
Projected DPPM	9233

## Additional Loading in LCO with MAT 2.0 PCO

	Qty Failures	% Validated FE
NMD	2	0%
Skip Write	1	0%
DNR	1	0%
20kHz Modualtion	1	0%

Total Failures 5  
Qty in Test 400

Raw DPPM	12500
Projected DPPM	12500

- Zest/ ATS – Addressed in 5C servo code
- ATI – caught in GIO, PCO8.2 TPI warp improvement
- Process escape – G-P merge correct in PCO 8.4 and HGAs new spec, paper sort
- Weak write – MQM, 20% effective today, VBAR by HMS V3 target end of May
- Defective Luxor/ – Supplier FA, clocking issue, investigating screen
- 20kHz – T180 screen end of May
- DNR – follows HDA in FA
- Process mass pro drives augment with GIO, until < 8K DPPM





## MS1110A1R1

FAMILY	CAP	WW 44	WW 45	WW 46	WW 47	May	MBS	Var	WW 48	WW 49	WW 50	WW 51	WW 52	June	MBS	Var	Qtr4 FY11	MBS	Var
GRENADA	1000	8,000	9,000	17,000	26,200	60,200	60,200	0	6,000	9,000	10,000	11,000	13,833	49,833	50,055	(222)	110,830	110,830	0
GRENADA	2000	6,220	3,260	3,260	7,260	20,000	40,000	(20,000)	13,160	17,540	20,340	25,140	27,618	103,798	89,250	14,548	124,589	129,589	(5,000)
GRENADA	3000	4,500	5,000	8,000	10,000	27,500	35,880	(8,380)	6,680	8,680	9,800	12,920	14,420	52,500	44,120	8,380	79,995	79,995	0
Total GRENADA		18,720	17,260	28,260	43,460	107,700	136,080	(28,380)	25,840	35,220	40,140	49,060	55,871	206,131	183,425	22,706	315,414	320,414	(5,000)

GiO Capacity	18,720	17,260	9,000	7,000	51,980				7,000	7,000	7,000	7,000	7,000	35,000			86,980		
Percentage	100%	100%	32%	16%	48%				27%	20%	17%	14%	13%	17%			28%		

- Factory team agrees to 100% ODT for the first two weeks and then measure performance and drop as appropriate with product performance capacity constraints and required metrics.





# SBS Qualification



Approval from SBS to ship Mass Pro; once the 100K MTBF is achieved. (Phil Rich & WenSan Lee-Morgan)

Rockit3.5 Desk: Driving the Q4 volume (Quanta)

- 1TB, 2TB & 3TB testing is complete: **Pass**
- LCO SBS SIE Target Mass Pro code: GR50. AM016V.CCD9 Complete: **Pass**

Rockit3.5 Home: Driving the Q4 volume (Quanta)

- 1TB, 2TB & 3TB testing is complete: **Pass**
- LCO SBS SIE Target Mass Pro code: GR50. AM016V.CCD9 Complete: **Pass**

Bronson: New SBS product Estimated RTS: July 2011 (GoFlex) not driving Q4 volume (CalComp)

- CTUs shipped: 63 3TBs, 20 2TBs, 20 1TBs
  - EVT build complete; no drive issues, working through enclosure FW issues
  - DVT starts 14 May





# SBS Approval for Z-Height

John,

As you said on our conversation the Z height over at 0.0045" should be OK with SBS 3.5" enclosure. If this is for short run / low volume I'm OK to ship them

Regards,

Cuong/

Cuong Tran

Sr Staff Hardware Engineer

Product Development

Seagate Technology Retail Group

On Tue, Apr 26, 2011 at 3:30 PM, John Mortellaro <john.mortellaro@seagate.com> wrote:

Hi Cuong,

This will be for the production volume through May. I will provide an update if it will be any longer than that.

Thanks,

John

Hi WenSan.

Can you review and let us know if we can get approval for the height out of spec condition for the early volume shipments? We meet with the SMT at 1:30pm our time sorry for the late notice reli just came to us this morning with the issue and we are going for SBS SAD today and this is an open item.

Bogart- 1.022 - 1.024"

Grenada - 1.027 - 1.032"

Z-height Spec: 1.0276"

Grenada over spec 0.0045"

We will figure out what is causing the issue and resolve it, but for the early volume is this acceptable?

It appears to be cover bow, but base casting may be contributing too.



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Page 18

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## Grenada Test Plan In Rockit

Test	Start		Time Needed Per Config	Finish		Number of Drives Per Config	Notes
	Expected	Actual		Expected	Actual		
Mechanical							
Acoustics USB 2.0 Speed	14-Feb	12-Feb	24hrs	15-Feb	12-Feb	2	USB 2.0 only
Thermal Limit	16-Feb	14-Feb	24hrs	17-Feb	16-Mar	2	
2" Op-Flat Drop	16-Feb	15-Feb	24hrs	17-Feb	16-Feb	2	
Op Topple	18-Feb	16-Feb	24hrs	18-Feb	17-Feb	2	
12" Non-Op Drop	21-Feb	17-Feb	24hrs	22-Feb	22-Feb	2	
Electrical							
DC Power Margining Test	14-Feb	15-Feb	24hrs	16-Feb	15-Feb	2	
PWR Loss Recovery	18-Feb	15-Feb	24hrs	19-Feb	15-Feb	2	
DC Power Consumption	16-Feb	14-Feb	24hrs	17-Feb	23-Mar	2	
PWR Cycle Test	22-Feb	15-Feb	120hrs	27-Feb	25-Mar	2	Issue in test due to SBS Bridge Board
Environmental							
Non-Op Thermal Cycle Test	15-Feb	15-Feb	96hrs	22-Feb	22-Feb	2	
Op Thermal-Cycle Test	15-Feb	15-Feb	96hrs	22-Feb	22-Feb	2	
EMC /Agency							
Radiated Emissions (3-m)	18-Feb	22-Mar	96hrs	23-Feb	28-Mar	2	USB 2.0 only, bare drive que is holding up testing
Radiated Emissions (10-m)	N/P	N/P	24hrs	N/P	N/P	1	
On-ESD	29-Mar	29-Mar	24hrs	1-Apr	1-Apr	2	USB 2.0 only Start Date dependent on completion of RE
Data-Integrity Test							
Mayhem Real World 2	27-Feb	27-Feb	240hrs	11-Mar	11-Mar	~10	Restarting DIT with 30 drives, all USB 3.0
Legend							
Target Start Date							
In Process							
Test Completed/Passed							
Problem/Test Failed							
N/P: Not Planned							



Grenada Test Plan In Raptor USB 2.0							
Test	Start		Time Needed Per Config	Finish		Number of Drives Per Config	Notes
	Expected	Actual		Expected	Actual		
Mechanical							
Acoustics	5-Apr	5-Apr	24hrs	6-Apr	5-Apr	2	
Thermal Limit	6-Apr	6-Apr	24hrs	7-Apr	8-Apr	2	11C Over Limit
2" Op-Flat Drop	11-Apr	11-Apr	24hrs	12-Apr	13-Apr	2	2 Failures. Both hard errors. In FA
12" Non-Op Drop	18-Apr	13-Apr	24hrs	20-Apr		2	
Electrical							
DC Power Margining Test	4-Apr	4-Apr	24hrs	5-Apr	5-Apr	2	
DC Power Consumption	6-Apr	5-Apr	24hrs	8-Apr	5-Apr	2	
PWR Cycle Test	15-Apr	6-Apr	120hrs	22-Apr		2	
Environmental							
Non-Op Thermal Cycle Test	28-Mar	26-Mar	96hrs	4-Apr	4-Apr	2	
Op Thermal-Cycle Test	6-Apr	7-Apr	96hrs	14-Apr		2	
EMC /Agency							
Radiated Emissions (3-m)	22-Apr		96hrs	29-Apr		2	
Radiated Emissions (10-m)	N/P	N/P	24hrs	N/P	N/P	1	
Op-ESD USB 2.0 only	TBD	TBD	24hrs	TBD	TBD	2	Dates determined by RE Testing completion
Data-Integrity Test							
Mayhem Real World 2	8-Apr		240hrs	15-Apr		~10	
Legend							
Target Start Date							
In Process							
Test Completed/Passed							
Problem/Test Failed							
N/P: Not Planned							
RAPTOR TESTING NOT COMPLETE							
RAPTOR not driving May volume							



## Key Actions:

- **20/47KHz Modulation Failures**

- PCO 8.0 and greater for clearance detect updates (Done)
- Implement Iris 4.5 gold contact suspension (Done)
- SWD clearance adjust feature and disabling DETCR bias after serial format (PCO 9.0 ~May 30)
- MD clearance hump if required (PCO 9.0 ~May 30 if required)
- Suspension tweak (DOE in progress date TBD)

- **Degraded Reader**

- SWD clearance adjust feature (PCO 9.0 ~May 30)
- Increased TA padding (PCO 9.0 ~May 30)
- Possibly HMRB9.8 (late 2011)

- **EAW**

- EAW screen with PCO 8.6 Test 234 limits (Done)
- Anneal process change from RHO (cut in at wafer, HGA flow to HSA and mass production May)

- **Z Height dimension failures from 3D**

- Closed with SBS, dimension delta is not applicable to their mounting scheme, no problem for SBS. (Done)
- Engineering in progress of analyzing failing configurations and will recommend CA (April 29)

- **Single-Bit Miscompare/IOEDC error with Nanya DDR**

- Removed from build configuration pending root cause and CA (Done)
- Root cause FA in progress (May 21)

- **Raptor SBS enclosure failures for temperature and drop test**

- Not included in this release! (Targeted for June after CA, FA in progress)





# SBS Mass Pro Configuration



# Grenada SBS Material Configuration

- Capacity: 1TB, 2TB, 3TB
- Part Numbers: 9YN162, 9YN164, 9YN166-568
- FW: GR50.CCD9. AM016V.CC93,xx5C
- PCO: GRN-008.6 or greater. **It is acceptable to screen drives tested with PCO8.3/8.4 but we must include the G to P merge screen and the Test 234 EAW specs of PCO8.6 to ship product certified with PCO 8.3/8.4**
- Screens: MQM
- Factory: Korat

## Key Material:

- Head Design: RHO BP4 or greater / MPT Iris 4.5, **Iris 4.3 can be used as long as 100% GIO test**
- Media: RMO G5
- Motors: Nidec, Alphana
- PreAmps: LSI only; until TI qualification WW48
- Power ASIC: McKinley XL: ST and TI
- DDRs: Winbond, Samsung, Hynix
- SOC: Luxor2.1 LSI

## BOM Exclusions – Not included in Gen Test Beds

- Depops, until RDT1 qualification
- TI PreAmp pending qualification in RDT1
- Fuji Media pending qualification in RDT1
- TDK Head pending qualification, target TBD
- **NHK suspension**



MS1110A2		W44	W45	W46	W47	W48	W49	W50	W51	W52	Q4'11
Demand	1TB	9000	9000	15000	27200	6000	9000	10000	11000	13828	110028
	2TB	5220	4260	4260	6260	13160	17540	20340	25140	27618	123798
	3TB	4500	5000	8000	10000	6680	8680	9800	12920	14420	80000
	Total	18720	18260	27260	43460	25840	35220	40140	49060	55866	313826
Outlook	1TB	6400	10119	15450	26320	5806	8709	9676	10644	13381	106505
	2TB	1700	4487	4839	4741	10261	13604	15707	19349	21243	95930
	3TB	2000	4189	8547	7224	4826	6270	7079	9333	10417	59886
	Total	10100	18795	28836	38285	20892	28583	32463	39327	45040	262321
Delta	1TB	(2600)	1119	450	(880)	(194)	(291)	(324)	(356)	(447)	(3523)
	2TB	(3520)	227	579	(1519)	(2899)	(3936)	(4633)	(5791)	(6375)	(27868)
	3TB	(2500)	(811)	547	(2776)	(1854)	(2410)	(2721)	(3587)	(4003)	(20114)
	Total	(8620)	535	1576	(5175)	(4948)	(6637)	(7677)	(9733)	(10826)	(51505)

- Outlook based on 1% lower yield per head ; 2%-1TB , 4-6%-2TB and 6%-3TB.
- Need actual yield demo on PCO 8.6.
- LCO has requested Factory to bias output reductions to the 3TB for Q4. Per discussion with Thanit this will be aligned from WW47 onwards.





# ***Grenada SIE SBS Test Status***

04/21/2011



**Cumulative SIE Test hours – 570,076**

**Cumulative SIE SBS Test hours (GR50) – 26,373**

## **GR50.CCD9.AM016V Test Summary:**

Drives tested: 41

Test hours: 72

Failed: 0

## **Grenada Current Open Issues – DISTY / OEM Gates:**

- SDD-0152854 Flash Led BD@8611 (Possible issue for SBS).
- SDD-0146961 Security Normal and Enhanced Erase aborting when it is expected to execute.
- SDD-0148913 CE Log Event Type incorrect for BGMS Entry
- RDD-0154887 CCTO Due to Write Retries Due to Bad Servo



# Yields/Test Time



**EAW Improvement Plan:**

- Current EAW spec is required for attaining and sustaining SBS SAD. Yield fallout is ~ 1% on a head-level basis.
- Improvement in 3 areas:
  - Head Design Improvements:
    - Wafers with SCOCA are already beginning to hit mass-pro. Should show an improvement in EAW performance.
    - Further wafer design improvements being worked with RHO (longer-term) through root cause FA.
  - System-Level Improvements:
    - Working with SE team to identify sensitivities to known KPIV's for EAW.
    - Expectation is to have a PCO delivered with system-level improvements to factory in 2 weeks time (target – FW45).
  - Screening Improvements:
    - Once EAW levels have been brought down with SCOCA wafers and System-level improvements, transition to P240 and associated specs and eliminate P234.

**BtC Yield Improvement Plan:**

- Current 2TB BtC drive yield (6-headers using S5) is ~ 40%.
- Major fallout areas:
  - Contact Detect – EC14841, EC14703 etc. accounts for ~ 10% (common with 3TB).
  - VBAR-related – EC13409, EC13406 etc. accounts for ~ 15%.
  - Flawscan-related – EC10532 etc. accounts for ~ 3%.
  - Weak-Write Screen – EC14180 accounts for ~ 6%.
  - Heater-Resistance Screen – EC12964 accounts for ~ 1% (common with 3TB).
- Improvements:
  - VBAR-related, Flawscan-related, Weak-Write related fallout have all been addressed with ET S5 spec change – cut in as of 4/25. Recovery rate ~ 75 – 80%.
  - Heater Resistance Issue – resolved in PCO 8.6.
  - Contact Detect Issues – Partially will be resolved in next PCO (detector selection change), partially need to drive ET spec change for instability screening (FA and data mining in progress).



# Test Time Reduction Status

## • Serial Port (2 head)

	Current	Target	7/1/11	8/1/11
PRE2	4.5	4.1	4.5	3.8
CAL2	6.2	4.2	5.2	4.1
FNC2	34.4	27.7	29.1	28.2
Serial Port	45.1	36.0	38.7	36.1

### Serial Port Test Time Reduction Plans (Gen2B w/o T234)

7/1/11

ZAP (CAL2) – 63.5 minutes (remove test – ZEST)

READ\_SCRN – 27.5 minutes (T199 – timeout issue)

SERIAL\_FMT – 231.7 minute reduction (remove test – DFS)

Serial Format and DFS are running in parallel until equivalency.

RE\_FORMAT – 62.6 minute (remove test – DFS)

8/1/11

BODEx – 47.1 minutes (remove test)

SVO\_SCRN – 12.6 minutes (remove tests)

AFHx – 36.5 minutes (T135 Optimization)

HIRP – 10.1 minutes (T191 Optimization)

Serial Port Description	Minutes				Hours			
	2H	4H	6H BTC	6H	2H	4H	6H BTC	6H
<b>GEN2C</b>								
ZAP (CAL2) Remove test-ZEST	63.5	127	171.45	190.5	1.1	2.1	2.9	3.2
READ_SCRN T199 Timeout Issue	27.5	55	74.25	82.5	0.5	0.9	1.2	1.4
SERIAL_FMT Remove test - DFS	231.7	463.4	625.59	695.1	3.9	7.7	10.4	11.6
RE-FORMAT Remove test - DFS	62.6	125.2	169.02	187.8	1.0	2.1	2.8	3.1
<b>SAD</b>								
BODEx Remove Test	47.1	94.2	127.17	141.3	0.8	1.6	2.1	2.4
SVO_SCRN Remove tests	12.6	25.2	34.02	37.8	0.2	0.4	0.6	0.6
AFHx T135 Optimization	36.5	73	98.55	109.5	0.6	1.2	1.6	1.8
HIRP T191 Optimization	10.1	20.2	27.27	30.3	0.2	0.3	0.5	0.5



# Test Time Reduction Status

- **I/O (2 head)** – Does not include IOSC2

	Current	Target	7/1/11	8/1/11
CRT2	0.6	1.0	0.6	0.4
FIN2	0.8	0.2	0.8	0.4
CUT2	0.7	0.3	0.7	0.7
I/O	2.1	1.5	2.1	1.5

- **I/O Test Time Plans**

- 7/1/11
  - No Actions
- 8/1/11
  - AFHx – 8.4 minutes (T135 Optimization)
  - AFH\_CLEANUP – 1.7 minutes (Replaced by AFH1 T109 cleanup)
  - Remove Performance Tests – replaced by DFS missed revs data

NOTE: Need to add T597 / T598 to FIN2 and add test time.





# YIP and Test Times LRP 40-06

Composite Prime Yield										Composite Insertion Yield					
SAD	Detailed Product Name	Heads	Capacity	Prime Yield (SAD +1 Mo)	Prime Yield (SAD +4 Mos)	Prime Yield (SAD +7 Mos)	Prime Yield (SAD +10 Mos)	Prime Yield (SAD +13 Mos)	Prime Yield (SAD +16 Mos)	Insertion Yield (SAD +1 Mo)	Insertion Yield (SAD +4 Mos)	Insertion Yield (SAD +7 Mos)	Insertion Yield (SAD +10 Mos)	Insertion Yield (SAD +13 Mos)	Insertion Yield (SAD +16 Mos)
11-Mar-2011	Grenada	6	3,000	43.1%	51.0%	54.0%	56.0%	58.0%	59.0%	28.1%	36.0%	44.0%	46.0%	48.0%	49.0%
11-Mar-2011	Grenada	4	2,000	54.1%	61.0%	69.0%	71.0%	74.0%	75.5%	44.1%	51.0%	59.0%	63.0%	66.0%	67.5%
11-Mar-2011	Grenada	2	1,000	72.0%	76.8%	82.0%	84.0%	85.9%	86.0%	64.0%	68.8%	76.0%	78.0%	79.9%	82.0%

							Composite Test Time					
Design Center	SAD	Detailed Product Name	Heads	Capacity	Process	Form Factor	Test Time (SAD +1 Mo)	Test Time (SAD +4 Mos)	Test Time (SAD +7 Mos)	Test Time (SAD +10 Mos)	Test Time (SAD +13 Mos)	Test Time (SAD +16 Mos)
LCO	11-Mar-2011	Grenada	6	3,000	Gemini	3.5	120.0	107.9	102.8	102.8	102.8	102.8
LCO	11-Mar-2011	Grenada	6	2,500	Gemini	3.5	112.0	100.8	96.0	96.0	96.0	96.0
LCO	11-Mar-2011	Grenada	6	2,000	Gemini	3.5	103.3	92.9	88.5	88.5	88.5	88.5
LCO	11-Mar-2011	Grenada	5	2,500	Gemini	3.5	100.9	90.8	86.5	86.5	86.5	86.5
LCO	11-Mar-2011	Grenada	5	2,000	Gemini	3.5	92.9	83.6	79.6	79.6	79.6	79.6
LCO	11-Mar-2011	Grenada	4	2,000	Gemini	3.5	81.8	73.6	70.1	70.1	70.1	70.1
LCO	11-Mar-2011	Grenada	4	1,500	Gemini	3.5	81.8	73.6	70.1	70.1	70.1	70.1
LCO	11-Mar-2011	Grenada	3	1,500	Gemini	3.5	62.7	56.4	53.7	53.7	53.7	53.7
LCO	11-Mar-2011	Grenada	2	1,000	Gemini	3.5	43.4	39.1	37.2	37.2	37.2	37.2
LCO	11-Mar-2011	Grenada	2	750	Gemini	3.5	39.3	35.4	33.7	33.7	33.7	33.7



# PCO 8.2/8.3 Yield Demo

## PCO GRN-008.2/8.3

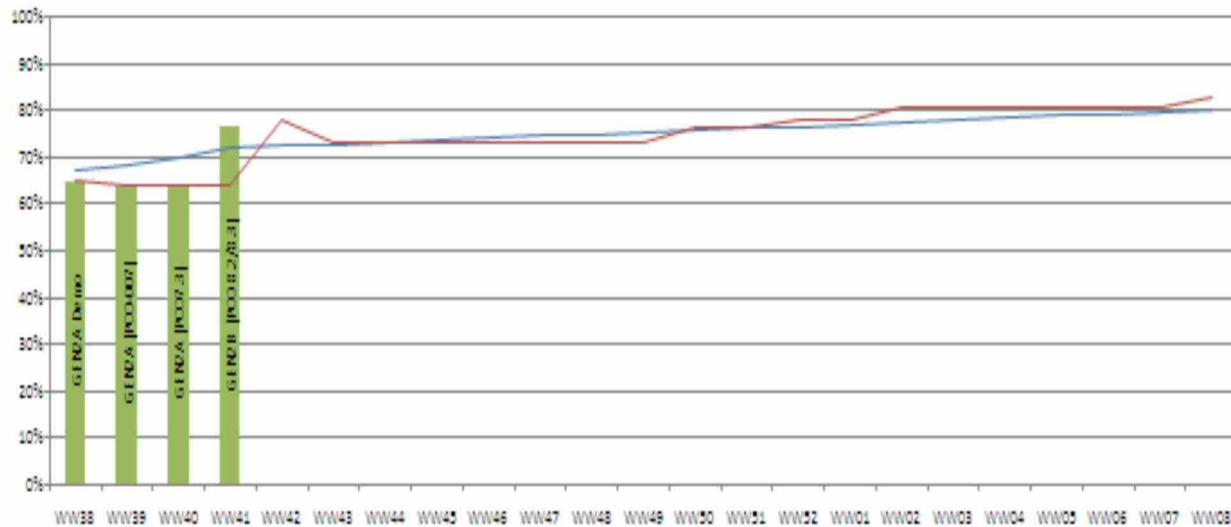
- Drives ran PRE2-FNC2 with 8.2 (ATI mitigation & 3D WTF niblets)
- Drives were intercepted in I/O with 8.3 to ensure they run Weak Write Screen (IOSC2)

	Start Qty	Capacity	PRE2	CAL2	FNC2	CRT2	FIN2	IOSC2	CUT2	Composite Yield
1D	965	1TB	90.7	94.5	94.1	97.7	99.6	97.9	100.0	76.8
2D	696	Combined	94.7	94.0	93.1	94.9	99.1	87.4	99.6	67.8
		2TB (618)		94.5	93.8	95.4	99.1	92.6	99.6	73.2
		1.5TB (48)		87.5	83.7	88.6	100.0	0*		
3D	994	3TB (540)	84.6	85.7	88.0	93.8	99.8	95.0	99.8	56.6
		2.5TB (237)		97.8	92.0	95.4	99.1	0*		

\* 0% yield is due to a process issue: depop support requires a plugin for WTF capacities. These drives can be recovered. Fix is in PCO 8.5.



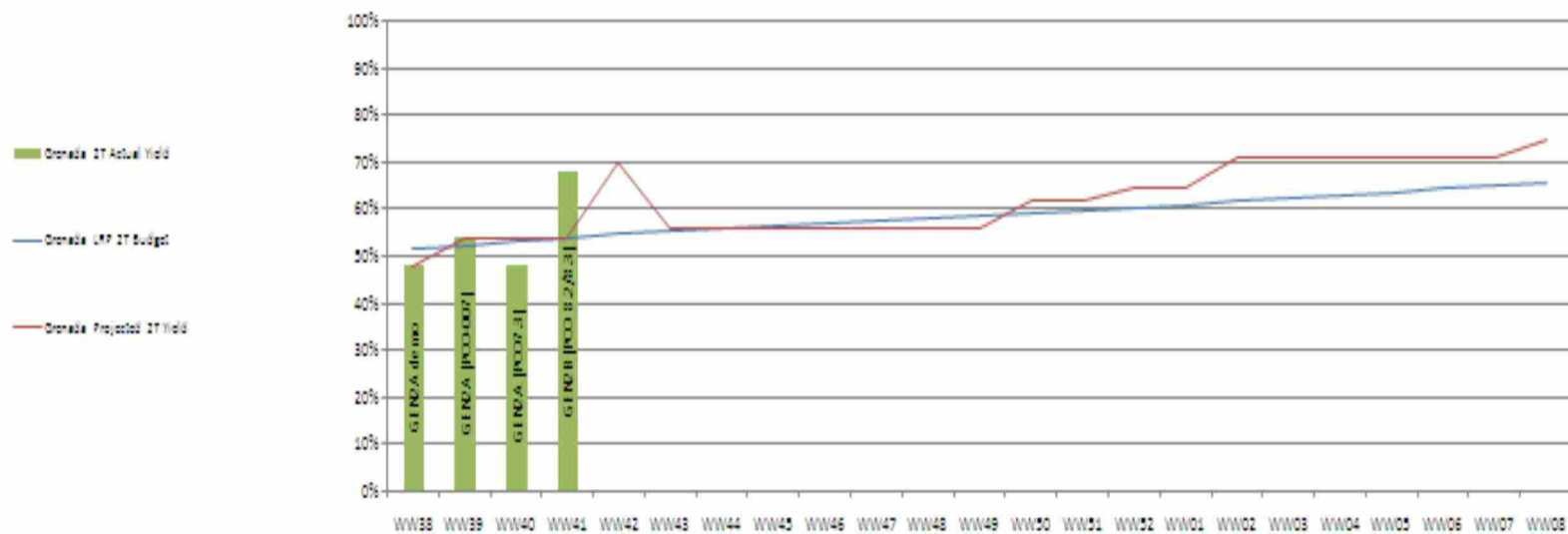
■ Grenada 1T Actual Yield  
— Grenada LRP 1T Budget  
— Grenada Projected 1T Yield



Grenada 1T Yield Improvement Plan				Improvement	Fallout	When	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW53	WW54	WW55	WW56	WW57	WW58		
EC 14841; AFH 35.1+ improvements (new AFH version)				0.8%	2.2%	W/W42					0.80%																		
C 42177, 42176, 14994; ZEST improvements (ZEST 4.0 release)				1.2%	2.4%	W/W43						1.2%																	
EC 10482; T50/T51 to run in LBA mode (SF3)				0.35%	0.71%	W/W43						0.35%																	
EC 10446; DFS padding improvements (DFS 6.6 release)				0.3%	0.6%	W/W43						0.30%																	
EC 10468; T240 EAW test setup improvements (SF3)				0.1%	0.2%	W/W43						0.10%																	
EAW Spec				-4%		W/W43						-3%																	
ATH/STE Spec				-4%		W/W43						-4%																	
Stability Spec				-1%		W/W43						-1%																	
Wafer EAW Improvement I (MNR)				1.5%		W/W43						1.5%																	
Wafer EAW Improvement II (VP4.1)				1.5%		W/W52															1.5%								
G6B Media Transition/Fuji FG3.2				3%		W/W02																3%							
BP84.5 (BP85 Writer on BP84 Reader) heads				3%		W/W50														3%									
BP85.5 heads				2%		W/W08																				2%			
Total YIP																													
Grenada 1T Actual Yield							65%	64%	64%	76.8%																			
LRP Grenada 1T Budget							67.4%	68.6%	69.8%	72.0%	72.4%	72.8%	73.2%	73.6%	74.0%	74.4%	74.8%	75.2%	75.6%	76.0%	76.4%	76.8%	77.2%	77.7%	78.1%	78.5%	79.0%	79.4%	79.8%
Grenada 1T Projected Yield							65%	64%	64%	64%	78%	73%	73%	73%	73%	73%	73%	73%	76%	76%	78%	78%	81%	81%	81%	81%	81%	81%	83%



## Grenada – YIP 2TB



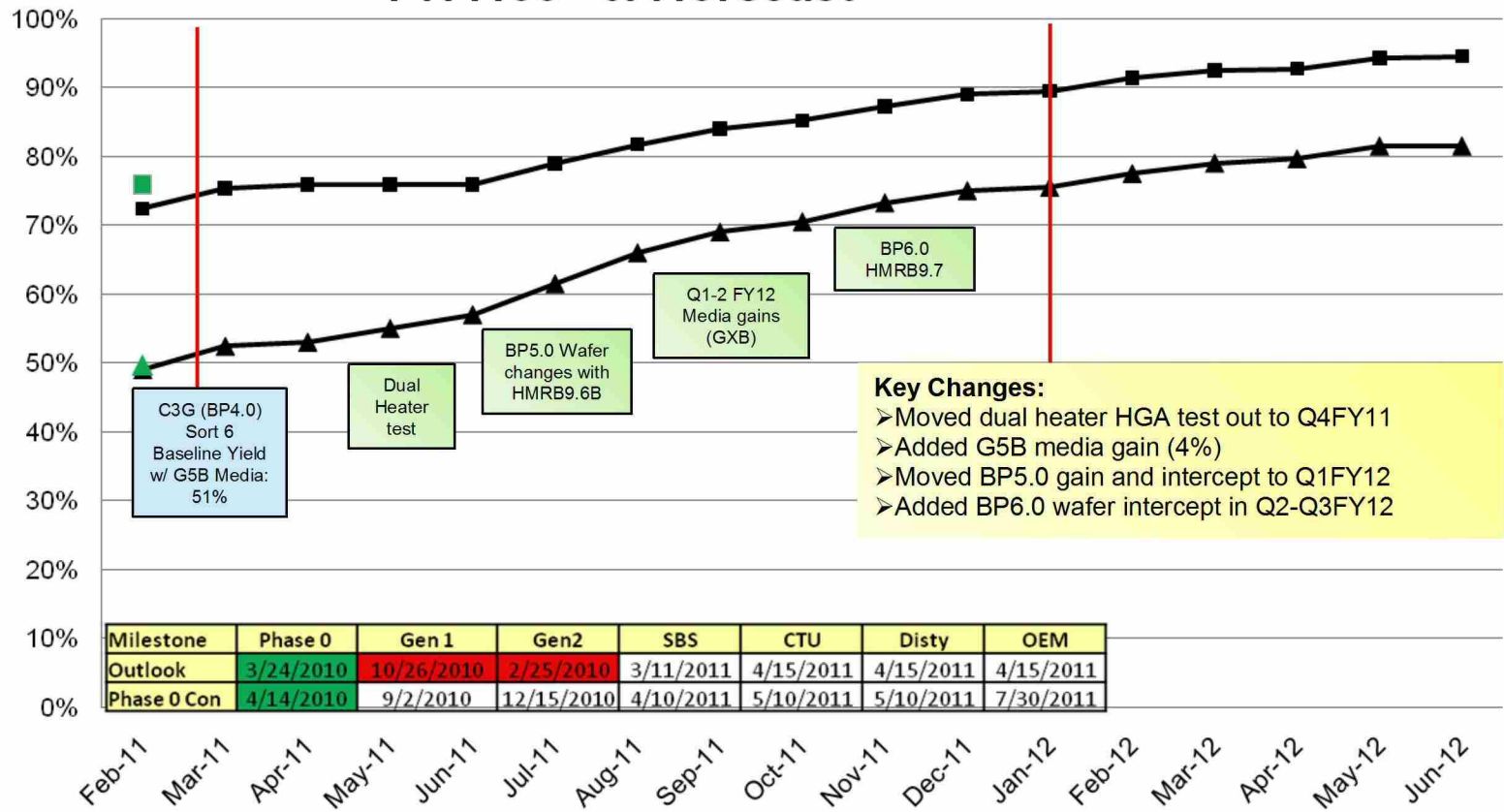
Grenada 2T Yield Improvement Plan	Improvement	Fallout	When	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03	WW04	WW05	WW06	WW07	WW08				
EC 14841; AFH 35.1+ improvements (new AFH version)	2%	4.5%	W/W42					2%																						
C 42177, 42176, 14394; ZEST improvements (ZEST 4.0 release)	0.15%	0.3%	W/W43						0.15%																					
EC 10482; T50/T51 to run in LBA mode (SF3)	1.12%	0.6%	W/W43						0.6%																					
EC 10446; DFS padding improvements (DFS 6.6 release)	0.1%	0.2%	W/W43						0.1%																					
EC 10468; T240 EAW test setup improvements (SF3)	0.1%	0.20%	W/W43						0.1%																					
EAW Spec	-8%		W/W43					-8%																						
ATH/STE Spec	-8%		W/W43					-8%																						
Stability Spec	-2%		W/W43					-2%																						
Wafer EAW Improvement I (MNR)	3%		W/W43					3%																						
Wafer EAW Improvement II (WP4.1)	3%		W/W52															3%												
G6B Media Transition/Fuji FG3.2	6%		W/W02																	6%										
BP84.5 (BP85 Writer on BP84 Reader) heads	6%		W/W50													6%														
BP85 heads	4%		W/W08																							4%				
Total YIP																														
Grenada 2T Actual Yield								48%	54%	48%	68%																			
LRP Grenada 2T Budget								51.7%	52.5%	53.2%	54.1%	54.7%	55.3%	55.8%	56.4%	57.0%	57.6%	58.2%	58.7%	59.3%	59.9%	60.5%	61.0%	61.7%	62.3%	63.0%	63.7%	64.4%	65.0%	65.7%
Grenada 2T Projected Yield								48%	54%	54%	54%	70%	56%	56%	56%	56%	56%	56%	56%	62%	62%	65%	65%	71%	71%	71%	71%	71%	71%	75%



Grenada 3T Yield Improvement Plan	Improvement	Fallout	When	WW33	WW34	WW35	WW36	WW37	WW38	WW39	WW40	WW41	WW42	WW43	WW44	WW45	WW46	WW47	WW48	WW49	WW50	WW51	WW52	WW01	WW02	WW03
EC 12964; Heater Current retry when value of zero is returned (PF3)	1.25%	2.3%	WW38						1.25%																	
EC 14942; parameter change in AFH 35 (SF3)	0.4%	0.8%	WW38						0.4%																	
EC 10522; Disable SWD prior to Write_Screen (PF3)	10%	12%	WW38						10%																	
EC 10479; T94 detor register reload change (SF3)	1.5%	2.9%	WW41									1.5%														
EAW Spec	-12%		WW41									-12%														
ATI/STE Spec	-12%		WW41									-12%														
Stability Spec	-3%		WW41									-3%														
Wafer EAW Improvement I (MNR)	4.5%		WW43										4.5%													
Wafer EAW Improvement II (WP4.1)	4.5%		WW52																			4.5%				
G6B Media Transition/Fuji FG3.2	9%		WW50																		9%					
BP#4.5 (BP#5 Writer on BP#4 Reader) heads	9%		WW50																		9%					
BP#5 heads	6%		WW08																							
Total YIP																										
Grenada 3T Actual Yield				41%	43%	41%																				
LRP Grenada 3T Budget				36.3%	37.1%	38.0%	38.8%	39.6%	40.5%	41.3%	42.2%	43.1%	43.8%	44.4%	45.1%	45.7%	46.4%	47.1%	47.7%	48.4%	49.0%	49.7%	50.4%	51.0%	51.3%	51.5%
Grenada 3T Projected Yield				41%	43%	43%	43%	43%	55%	55%	55%	29%	29%	34%	34%	34%	34%	34%	34%	34%	52%	52%	56%	56%	56%	56%



## Grenada HGA Electrical Test Yield Projection FW1133 - 9A forecast



	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12
FW1133 CYP (9A) - Cum	73%	75%	76%	76%	76%	79%	82%	84%	85%	87%	89%	90%	91%	93%	93%	94%	95%
Actual yield - Total	76%																
FW1133 CYP (9A) - Sort 6	49%	52%	53%	55%	57%	62%	66%	69%	71%	73%	75%	76%	78%	79%	80%	82%	82%
Actual yield - S6	50%																

## Q3FY11

S6 outlook at 53% to a plan of 52%

Cum yield outlook of 76% to a plan of 75% for Q3FY11

Key improvements:

- G5B media (gain of 0.15 decade)
- ADC optimization (HGA to drive) for mass production wafer

## Q4FY11

S6 outlook at 57% by end Q4FY11

Cum yield outlook of 78% to a plan of 76% for Q3FY11

Underpinned yield improvement actions:

- Dual heater test implementation at HGA
- Optimized writer target for mass production wafer

## Q1/Q2FY12

Cum yield at 87% and S6 yield to 75% by end Q2FY12

- Critical path items include BP5.0 transducer and G6B media implementation





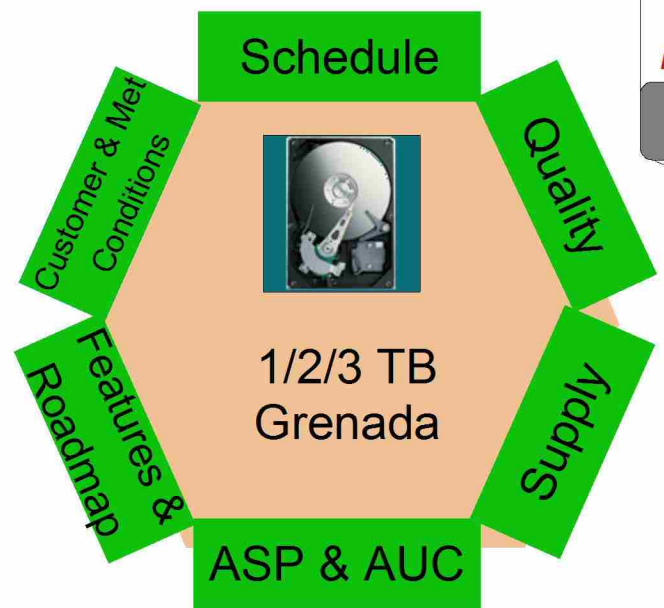
# Back Up



# Grenada SAB Milestones

Functional Organization	Deliverables	MileStone	Criteria	Last Update	Current Status	Risk	Owner
<b>1. Milestone Criteria</b>	168-Hr DPPM Goal Achieved	Yes		03/04/2011	Not Posted	No Risk Assigned	Glen
	All contract items are within variance and projected to remain so	Yes		03/04/2011	Not Posted	No Risk Assigned	Pat Dewey
	Complexity Health Index - Does not deviate from Phase 0 Contract	Yes	A. CH Index Score B. CC Budget	04/21/2011	Achieved	Low Risk	John Mortellaro
	Component sources defined on the SSP approved to AML level AB. Exceptions have defined/underpinned closure plans. Qualified Sources can support Master Schedule Requirements.	Yes		04/21/2011	Achieved	Low Risk	Bob Kolanda
	Exceptions to previous Phase Review closed	Yes		03/04/2011	Not Posted	No Risk Assigned	
	Factory Prime Yields meet Phase 0 goal	Yes	Goal = xx% LP, xx% LD, xx% LDD	04/25/2011	Achieved	Low Risk	Kevin Stenvall
	Firmware/Compatibility Testing Complete - All High Risk items fix validated.	Yes		04/21/2011	Achieved	Low Risk	Matt Sadafi
	Gen 2/3 Product Assurance and Factory Testing Complete - All High Risk items fix validated.	Yes		03/04/2011	Not Posted	No Risk Assigned	Glen
	Integration DPPM Goal Achieved	Yes		03/04/2011	Not Posted	No Risk Assigned	Glen
	Inventory / Material Disposition - Complete roll-up of all Factory and DC pre-SAD config inventory/WIP/FG and Disposition	Yes		04/22/2011	Achieved	Low Risk	Bob Kolanda
	MTBF Goal Achieved	Yes	SBS = 100K, Actual = XXX	03/04/2011	Not Posted	No Risk Assigned	Glen
	Process Readiness Audit and Process Verification Test Results approved by the Volume Factory and Design Center. - Includes QA Hardware/Software Readiness - Includes Rework Qualification	Yes		04/27/2011	Achieved	Low Risk	Kevin Stenvall
	Product Stewardship Declaration of Compliance at a minimum of 95% completed.	Yes		04/22/2011	Achieved	Low Risk	Bob Kolanda
	SLAM Deliverables completed and entered into ADD/DD database.	Yes		04/22/2011	In Progress	Low Risk	Pat Dewey





**Legend**

Within Boundary  
Boundary at Risk  
Boundary Violation

Pre FCS Status  
Post FCS Status

SCHEDULE

- Grenada qualification on Rokit Desk and Home- Pass (Apr. 18)
- Target First HDD shipment on May 1

QUALITY:

- RDT:
  - Project MTBF>=100K Hrs in Week 43
  - Reliability Review with Retail on Apr. 22
- Joint Qualification Status:
  - QSI : Pass (both Rokit Desk and Home)
  - Raptor (USB 2 and USB 3): JQ to start in week 44
- Thermal retest with JIT 3 FW : pass
  - Thermal measurements meet 65C spec limit at system level; for GoFlex Desk and Go Flex Home

•SUPPLY:

- Q311: (WK44-45)
  - 3TB : 11K
  - 2TB: 23K

ASP & AUC:

Grenada TVC:

- Q411: 3TB:\$75(vs. MantaRay\$91)
- Q112: 3TB: \$60 (vs. MantaRay \$80)

FEATURES & ROADMAP:

- 2 and 3TB Barracuda Internal kits in Q1

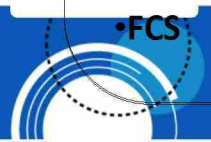
CUSTOMER & MARKET CONDITIONS:

MILESTONES

✓ Pre CTU Shipment (for EMI)	01/13
✓ CTU shipment (35X per product)	02/20
✓ SIE Qual start	02/08
✓ Rokit 3.5" Joint Qual starts	02/25
✓ RDT Starts (Korat & LCO): 500 units	02/25
▪ Demo 100K MTBF	04/25
✓ Rokit Desk/Home JQ complete	04/18
•1 <sup>st</sup> shipment (35K units): Korat	05/01
	05/15

•FCS

•N/A



## Short Term CA

- MAT 2.0 test bed, running currently in Korat, has the following MD contact detect improvements:
  - ✓ Moved MD contact detect zones to higher skew
  - ✓ Increased revolutions at low skew zones (from 30 to 50) to improve contact detect SNR
  - ✓ Optimized AGC detector for Luxor 2 compatibility
  - ✓ Reduced FFT frequency binning to accommodate servo sample rate/ gimbal mode overlap
- MAT 2.0 currently through Baseline ODT and in RDT client (700 drives ~ 150 hrs) at Korat with two 47kHz failure
- 400 drives shipped to LCO for 5K feet modulated write fix effectiveness testing (0 47kHz failures ODT, RDT Client/ABT in test)

## Medium Term CA

- Characterization of modulated write susceptibility for NHK suspensions – preliminary data show no mode at 47kHz
- MD target Clearance Hump – RSS penalty under evaluation 5/29
- T227 (SWD) evaluation on failing drives – evaluation of failing drives in process (ECD 5/29)
- Reduce FFT frequency for AGC detector, concern over head instability impact. (TBD)
- Clearance Error with DETCR turned on (2-3A) additional margin, failures repeat, TVM inprogress

## Longer Term CA

- MPT suspension change to move gimbal frequencies away from 47kHz – RHO
  - ✓ Need to understand TDK performance
  - ✓ Need to understand UP versus Down suspension behavior differences observed
- Continue to explore advanced contact detect schemes that can deal with modes excited at servo sample rates (i.e 47kHz in current case)





PFL	SN	HD_POS	HD_ID	SBR	TEST BED	TEST	TTF	P240 STATUS	IMPLEMENTED P234 SPEC STATUS
871	Z1E00BKV	2	BD301WUII2	TKGRD4HW40A	47kHz Modulated Write Eval	ABT	11.5 hrs	Does NOT Catch	Does NOT Catch
875	Z1E00BHC	2	BD301WT0D2	TKGRD4HW40A	47kHz Modulated Write Eval	ABT	29.6 hrs	Does NOT Catch	Does NOT Catch
853	Z1F009A1	4	C3G2UA9LY1	KTGRD61093AR	MAT 2.0	BL_ODT	14.0 hrs	Does NOT Catch	Does NOT Catch
876	Z1E00BNF	0	BD302E8QJ2	TKGRD4HW40A	47kHz Modulated Write Eval	ABT	38.3 hrs	Does NOT Catch	Catches
886	Z1F0098Q	0	C3G2UAL4Q0	KTGRD61093AR	MAT 2.0	BL_ODT	149.9 hrs	Does NOT Catch	Does NOT Catch
693	Z1F00BL7	4	C3G2WD4KY0	TKRMO6H3DA	Korat Recycled Media Qual	BL_ODT	31.5 hrs	No Data	Catches
785	Z1F00B7P	3	C3G2UDUYG0	TKRMO6H3DA	Korat Recycled Media Qual	RDT-C	298.0 hrs	No Data	Does NOT Catch
807	Z1F002K6	2	C3G2RYRHP1	LCGRDATI3DA	PCO 8.2 ATI Mitigation Eval	BL_ODT	38.0 hrs	Catches w/ 3.4 spec	Catches
914	Z1F008M6	4	C3G2UA9PS1	KTGRD61093AR	MAT 2.0	RDT-C	164.5 hrs	Does NOT Catch	Catches
925	Z1F00BQD	1	C3G2XQH2J1	SBGRNPCO81R	MAT 2.0	RDT-C	307.3 hrs	Catches w/ 4.4 spec	Catches
RE/11/452	Z1F004T1	4	C3G2UFGYN1	TKGRNCTU3D1A	GIO for CTU	GIO		Catches w/ 3.3 spec	Catches
475	Z1E004ED	3	C3G2UAXOB1	KTGRD40400A	MAT 1.4	BL_ODT	10.9 hrs	Does NOT Catch	Does NOT Catch
498	Z1E004EG	1	C3G2UAWJP1	KTGRD40400A	MAT 1.4	dRDT-C	13.2 hrs	Catches w/ 2.67 spec	Does NOT Catch
481	Z1E004SR	1	C3G2UAT0Y1	KTGRD40435A	MAT 1.4	BL_ODT	25.2 hrs	Catches w/ 3.7 spec	Catches
446	Z1F002K6	2	C3G2RYRHP1	KTGRD60625A	MAT 1.4	dRDT-C	18.9 hrs	Catches w/ 3.4 spec	Catches
RE/11/556	Z1F0083M	5	C3G2UGVEC1	KTGRD61120A	GIO for MAT 1.4	GIO		Catches w/ 2.3 spec	Catches
RE/11/508	Z1F0083R	3	C3G2UAC2I1	KTGRD61120A	GIO for MAT 1.4	GIO		Catches w/ 3.7 spec	Catches
536	Z1F004W3	1	C3G2UA7GQ0	KTGRD61120B	MAT 1.4	BL_ODT	32.6 hrs	No Data	Catches
507	Z1F00522	2	C3G2UAE2W0	KTGRD61120B	MAT 1.4	BL_ODT	7.8 hrs	Catches w/ 1.8 spec	Catches
508	Z1F00537	5	C3G2UAYLF1	KTGRD61120B	MAT 1.4	BL_ODT	9.8 hrs	No Data	Does NOT Catch
963	Z1E00BT4	0	BD301WU5Y1	TKGRD4HW40A	47kHz Modulated Write Eval	ABT	130.6 hrs	Does NOT Catch	Catches
959	W1F00118	0	C3G2UDWGO1	WUGRS60949A	Kaifa Rwork HSA Qual	TVM	24.6 hrs	No Data	Catches
	Z1E007L7	0	C3G2UA73Q1	TKGRN4H2B2	??	GIO		Does NOT Catch	Does NOT Catch

## MAT 2.0:

- 4 EAW failures seen to date in MAT 2.0. This is after CQ based sorting for gEAW at HGA ET.
- Test 234 spec designed to capture failures. Based on MAT 2.0, MAT 1.4, and recent EAW failures from other test beds, spec is ~ 59% effective.
  - In PCO 8.6 – already sent to the factory.
  - Cost is ~ 1.1% on a head-level basis. ~ 6% expected nominally on 6-header drives with swings from 1% to >10% fallout depending on heads in specific SBRs. BtC Yield fallout will be larger.
  - Test 240 effectiveness is poorer and Yield cost is higher.
  - Experiments to improve EAW performance under way: Expect Completion by FW44. Transition to Test 240 based spec after EAW levels are reduced.
  - Also investigating Super CQ spec at HGA in addition to established CQ specs for gEAW.



## Grenada - DR/Product Manual Compliance (Page 1 of 5)

								SBS Info
Shock and Vibration	Spec.	Gen 1 1000 GB	Gen 1 1500 GB	Gen 1 2000 GB	Gen 1 2500 GB	Gen 1 3000 GB	Comments / Corrective Action Description EM	SBS Req.
Topple Drop	1/2 Disc: 120 degrees 2/3 Disc: 90 degrees	0 / 5	NPIP	NPIP	NPIP	0 / 5		Y
Operating Vibration - Random	No Spec	0 / 12	NPIP	0 / 3	NPIP	0 / 3		Y
Operating Vibration - Linear Random	80% TPT @ .004 G2/Hz (5-500 Hz) 1.4 GRMS (ref)	0 / 12	NPIP	0 / 3	NPIP	0 / 3		Y
Operating Vibration - Rotary Random	80% TPT 12.5 rad/sec² @ 10 - 1500 Hz	0 / 12	NPIP	0 / 3	NPIP	0 / 3	Non-HP (8.5 ?). RVFF needed for HP 12.5 spec.	Y
Operating Shock Six Axis 2 ms	40 G's	0 / 9	0 / 3	0 / 6	NPIP	1 / 6 FE 0%	Op Shock Write Failure @ 80Gs	Y
Non-Operating Shock Six Axis (.5msec)	200 G's	NPIP	NPIP	0 / 3	NPIP	ECD 5/1		Y
Non-Operating Shock Six Axis (1msec)	300 G's	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		Y
Non-Operating Shock Six Axis (2msec)	1/2 Disc: 350 G's 2/3 Disc: 300 G's	0 / 6	0 / 6	NPIP	NPIP	0 / 3		Y
<b>4 Corner</b>								
Thermal Voltage Margins	0 - 60C / 5%, 10% Voltage limits		NPIP		NPIP		PCO 8.0 Checkout Results: 85% Pass. Projected 92% Pass. Additional PCO 8.2 drives will be tested in Suzhou ww42	Y
<b>Environmental Stress</b>								
Accelerated Storage Test 60C/80RH	21 Day - 60C/80% RH	1/22	0 / 10	0 / 22	NPIP	1/22	1x Defect, 1x Modulated Write (LCO)	
Transit Storage Environment	-40-36C/10-90% RH	0 / 10	NPIP	0 / 6	NPIP	0 / 6		N
Hot Storage Test	72 hrs - 85C/40% RH (Pass Criteria of <5% Fail Rate)	NPIP	NPIP	1 / 21	NPIP	NPIP		Y





04/26/2011

## Grenada - DR/Product Manual Compliance (Page 2 of 5)

Head/Media Interface	Spec.	Gen 1 1000 GB	Gen 1 1500 GB	Gen 1 2000 GB	Gen 1 2500 GB	Gen 1 3000 GB	Comments / Corrective Action Description EM	SBS Info
								SBS Req.
Altitude	-200-40000	NPIP	NPIP	ECD 4/18	NPIP	0 / 4	1 Failure on 2D. Drive in Retest.	Y
Ambient L/U/L Soft	300K cycles/600K Margin	NPIP	NPIP	ECD 5/1	ECD 3/30	ECD 5/1		
Stress L/U/L Soft	300K cycles/600K Margin (32C, 80%RH)	NPIP	NPIP	ECD 5/1	ECD 3/30	ECD 5/1	2 Failures. 1x Degraded Head @ 279k cycles. 1x Seek Timeout @ 284k cycles	
Stress L/U/L Soft	300K cycles/600K Margin (5C, 20%RH)	NPIP	NPIP	ECD 5/1	ECD 3/30	ECD 5/1		
Stress L/U/L Soft	600K cycles/1.2M Margin (60C, 20%RH)	NPIP	NPIP	ECD 5/1	ECD 4/10	ECD 5/1		
Stress L/U/L Soft	300K cycles/600K Margin (5C, 20%RH)	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		
Ambient L/U/L Hard	50K cycles	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		
Stress L/U/L Hard	20K cycles (5-55C, 8-80%RH)	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		
Stress L/U/L Hard	20K cycles (5-55C, 8-80%RH)	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		
Stress L/U/L Hard	20K cycles (5-55C, 8-80%RH)	NPIP	NPIP	ECD 5/1	NPIP	ECD 5/1		
<b>Power</b>								
DC Current and Power Consumption	2.8A Max	10 / 25 FE 0%	NPIP	2 / 5 FE 0%	NPIP	5 / 5 FE 0%	Sleep/Standby exceeding spec	Y
Power Loss Recovery	+/- 10% on 12V, +/- 5% on 5V	0 / 25	NPIP	0 / 5	NPIP	0 / 5		Y
Power Supply Ramping		0 / 25	NPIP	0 / 5	NPIP	0 / 5		Y
DC Ripple and Conducted Noise	5V (100mV), 12V (120mV)	0 / 25	NPIP	0 / 5	NPIP	0 / 5		Y
PCBA Thermal Map		NPIP	NPIP	NPIP	NPIP	0 / 2		Y



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Page 44



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## Grenada - DR/Product Manual Compliance (Page 3 of 5)

Packaging	Spec.	Gen 1 1000 GB	Gen 1 1500 GB	Gen 1 2000 GB	Gen 1 2500 GB	Gen 1 3000 GB	Comments / Corrective Action Description EM	SBS Info
								SBS Req.
Free Fall Impact		TBD	NPIP	TBD	NPIP	TBD	Issues with shaker table in Thailand. Date TBD	Y
<b>Mechanical</b>								
Crash Stop Impact		TBD	NPIP	NPIP	NPIP	NPIP	Pending Servo Code	N
Weight and Dimensions		0 / 5	NPIP	0 / 5	NPIP		3D config failing for Z-Height out of spec	Y
<b>Agency</b>								
ElectroMagnetic Compatibility		NPIP	NPIP	NPIP	NPIP		SBS Required CERTs Complete. Formal EMC Passed, reports are in progress.	Y
Electro-Static Discharge - Op (Stand Alone)	8kV contact, 15 kV air. (in system)	0 / 2	NPIP	NPIP	NPIP	0 / 2		Y
Electro-Static Discharge - Non Op (Stand Alone)	8kV contact, 15 kV air. (in system)	0 / 2	NPIP	NPIP	NPIP	ECD 4/13		Y
Safety Certification		NPIP	NPIP	NPIP	NPIP		SBS Required CERTs Complete. Formal EMC Passed, reports are in progress.	Y
Radiated Emmision (Stand Alone)		NPIP	NPIP	NPIP	NPIP		SBS Required CERTs Complete. Formal EMC Passed, reports are in progress.	
<b>Acoustics</b>								
Acoustic Sound Power	Idle:1D(2.4/2.6)/2D(2.5/2.7) 3D(2.6/2.8)/4D(2.8/3.0)	0 / 100	NPIP	0 / 50	0 / 24	0 / 70		Y
PDT Prominence Ratio	9 dB	1 / 40	NPIP	0 / 10	0 / 10	NPIP		Y
Acoustic L/LUL	1/2 Disc: 38 (dB)/3.0 Sones 3/4 Disc: 42 (dB)/3.4 Sones	0 / 20	0 / 5	1 / 5	0 / 5	0 / 5		Y
Acoustic Latch - Power off Retract	1/2 Disc: 46 (dB)/3.3 sones 3/4 Disc: 50 (dB)/3.7 sones	1 / 20 FE 0%	2 / 5 FE 0%	2 / 5 FE 0%	2 / 5 FE 0%	0 / 5		



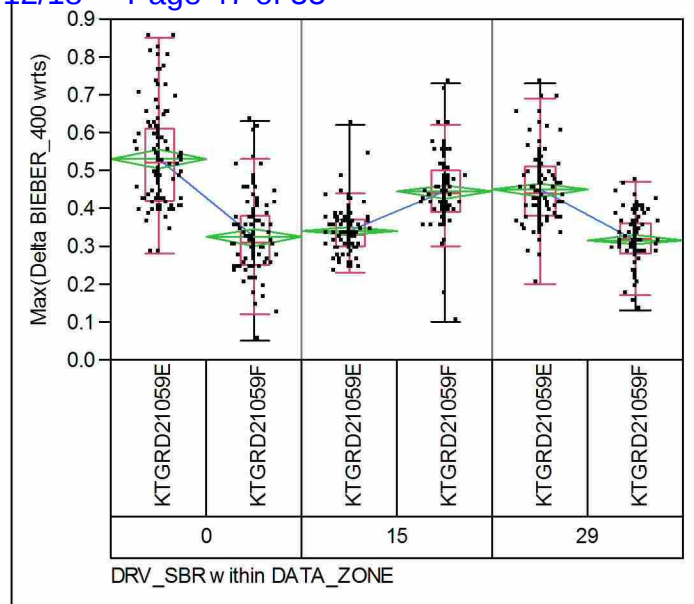
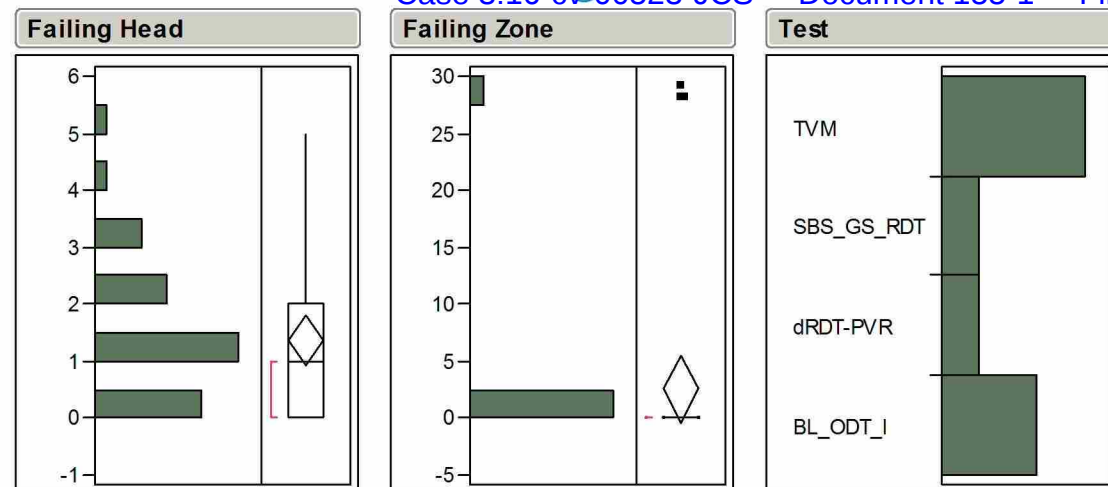
Confidential

Page 45



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### Analysis of 33 recent ATI failures:

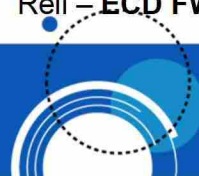
- Bacall MAT 1.1 and Grenada MAT 1.4 and Korat HSA Qual Test Beds.
- Failures at extreme OD and extreme ID. No clear upstream signatures noted.
- Clear evidence of compromised TPI margins at extremal skews.

### Mitigation Steps Taken:

- Re-Warp the TPI profile to afford greater margin at extremal skews – **Done**. In **PCO8.2** – to be sent to factory **3/30** at the latest. **Target FVT**.
  - ATI margin and distributions improved dramatically relative to older TPI Warp.
- Modifications to BIE-DOS settings (Mike Schaff).
  - DOS scans more aggressive with reduction in # of iterations from 15 to 10, and lowering of BIE threshold for refreshes from 50 to 8.
  - Validated on bench to recover 3 out of 4 PFLs.
  - Code in checkout in SIE prior to release for **MAT 2.0 and FVT**.
  - Changes will be implemented in Bacall as well.

### Validation Steps:

- 14x 1D and 11x 3D confirmed ATI failures are being re-CERT'ed with **PCO 8.2**. Will be flashed with latest **BIE-DOS F3** code and validated in Reli – **ECD FW40**.



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Seagate Confidential – Special Handling



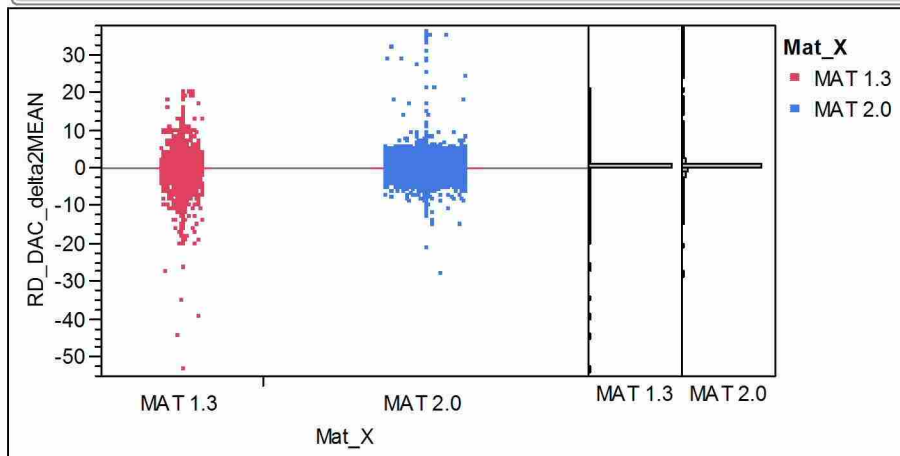
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- Charts below show the improvement of variation of a heads individual contact profile to that of the average head.
- A small mean shows less contact profile variation from head to head.
- MAT2.0 code shows significant improvements with contact profile variation

Fit Y by X Group

Oneway Analysis of RD\_DAC\_delta2MEAN By Mat\_X MSRD\_INTRPLTD=I



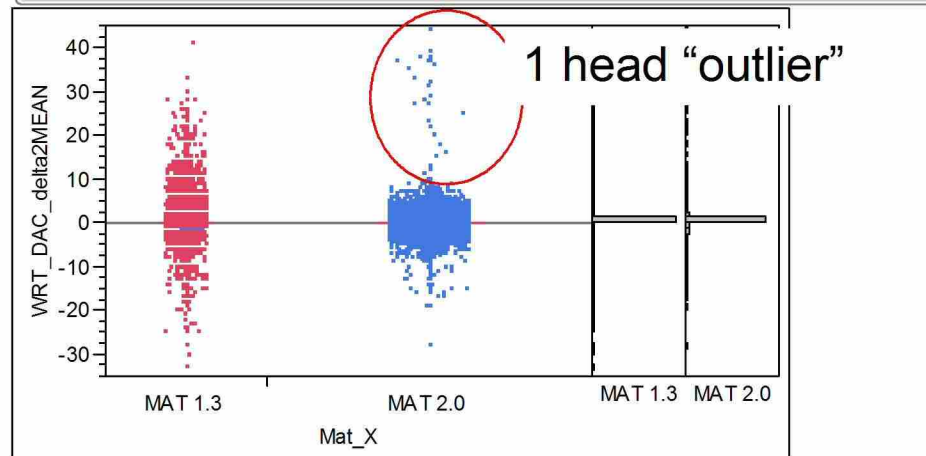
## Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
MAT 1.3	-53	0	0	0	0	0	20
MAT 2.0	-28	-0.5	0	0	0	0.666667	37

## Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
MAT 1.3	152070	-0.03898	0.782358	0.00201	-0.0429	-0.0350
MAT 2.0	305070	2.95e-5	0.893791	0.00162	-0.0031	0.0032

Oneway Analysis of WRT\_DAC\_delta2MEAN By Mat\_X MSRD\_INTRPLTD=I



## Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
MAT 1.3	-33	0	0	0	0	0	41
MAT 2.0	-28	-0.5	0	0	0	0.666667	44

## Means and Std Deviations

Level	Number	Mean	Std Dev	Std Err Mean	Lower 95%	Upper 95%
MAT 1.3	152070	0.019320	1.06721	0.00274	0.0140	0.02468
MAT 2.0	305070	0.003107	0.95989	0.00174	-0.0003	0.00651





# Grenada – DISTY SAD Outlook

	W W 44	W W 45	W W 46	W W 47	W W 48	W W 49	W W 50	W W 51	W W 52
R D T	B u i l d / C e r t								

WW48 Korat 500 hours, Risk Check Point

WW51 Korat 1K hours, Check Point

- Recommend that we remove Disty Volume from Q4.
- RDT build start in WW44, drives into Reli WW45, with 500hr check point in WW48.
  - Assumes that we are comfortable with 47Khz containment, solution!





# Grenada DT Complexity

John Mortellaro  
April 7, 2011



Continue the strategy from Pharaoh with new learning

- Current BOMs SBS & Disty: 100% HDA and PCBA usage
- Eliminated restrictions for non-LH and no top cover damper
- Std OEM: 19 of 24 customers including Dell
  - Potential risk: NEC, Samsung and Sony dppm and FW changes
  - Potential risk: Dell will be Std OEM at launch, FW learning's from Tier 2 & 3 qualifications
- RVFF: HP with RVFF, Apple potential risk
- Other Key Potential Risks:
  - Suzhou quality
  - Apple acoustic, multiple head configs (ex. 6H, 5H & 4H- 2TB)
  - Special tests or components to improve customer quality



# Grenada Restriction Risk & Opportunity

Case 3:16-cv-00523-JCS Document 155-1 Filed 01/12/18 Page 52 of 55

**Grenada Customer and Internal Restriction Matrix**

Restriction	Disty	STD OEM	Dell	HP	Lenovo	Apple	FSC	Samsung	NEC	Sony	Pace	SV-STD OEM	SBS- NAS	SBS
FY12 Volumes	28,979,029	4,445,575	7,507,500	7,374,900	5,191,875	897,000	273,000	263,250	243,750	117,000	-		620,000	
Media														
HSA's														
MBA														
Cover						unique damper cover								
HDA's						WF and Depop HDA's								
PCBA				RVFF		RVFF, Pharaoh PCBA, 0 ohm resistors								
Balance Control				FBP1<12.5 (98%)		FBP1<12.5 (98%)								
GOTF		OEM	OEM	OEM	OEM	OEM	OEM	OEM	OEM	OEM	OEM	OEM		
T25 screen														
Customer Special Test		Dell FRD	Dell FRD	10G screen, 1MOs		Blue nun test ATI test (7hrs/Disc)							fullsurface 0 screen	
FW	CCD4	CCD4	CCD4	HP01	CCD6 DST	AP01	CCD4	CCD4	CCD4 OS not found	CCD4	CCD4	CCD4	CCD4	CCD4
Mfg Site	WX/SZ/KT	WX/SZ/KT	WX/SZ/KT	WX/SZ/KT	WX/SZ/KT	WX/KT	WX/SZ/KT	WX/SZ/KT	WX/KT	WX/KT	WX/SZ/KT	WX/SZ/KT	WX/SZ/KT	WX/SZ/KT

Remark:	52%	8%	13%	13%	9%	2%	0%	0%	0%	0%	0%	0%	1%	0%
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	No restriction on this part													
	Customer Restriction on this part													
	Seagate Restriction on this part													
	Potential restriction risks on Grenada													

Volumes are current Pharaoh volumes

Actions/ watch items:

1. Evaluate the differences in GOTF, can we consolidate? Consolidate to OEM and Std only
2. Apple does not want to take 6H and 5H 2TBs, need to highlight in DR and provide data to convince them
3. HP and Lenovo prefer not to have depop configs. Add depops to RDT, not required in CTUs?
4. Additional non- customer required screens/ test that are put in to maintain quality levels, review current screens/ tests that are being done on Pharaoh/ Bogart
5. Improve quality levels at Suzhou, currently DQ'd on Pharaoh at Apple, internal restriction to NEC and Sony
7. Apple Acoustic and PCBA restrictions. Need to test acoustics and frequency in Gen2
8. FW SBS and Disty on JIT3 for SBS Thermal and maintain performance for Disty



CC Summary		
Actual	0	
Budget	80	Commit at Phase 0
Forecast	54	Current Forecast
Delta	26	Budget minus Forecast

CH Index Summary		
Actual	0	
Budget	296	Commit at Phase 0
Forecast	90	Current Forecast
Delta	206	Budget minus Forecast

CH Ratio Summary		
Actual	0.00	
Budget	3.70	Commit at Phase 0
Forecast	1.67	Current Forecast
Delta	2.03	Budget minus Forecast

BASE CONFIGURATIONS			
Capacity	Cache	Interface	Configs
3000	1	1	1
2500	1	1	1
2000	1	1	1
1500	1	1	1
1000	1	1	1
750	1	1	1

6 Standard Tabs

Configuration Driver Report		Total
Base Number of Configurations: SBS		6
Customer Unique Code Apple, HP, Dell, Lenovo,		24
Customer Unique Labeling: Std OEM. Japanese OEMs		12
Disty: Seagate/ Maxtor		12
Total Configurations		54

## Risks:

- NEC, Sony and Samsung dppm and FW changes that could occur during qualification
- Dell on Std OEM at launch, FW improvements learned during qualification



## Current Restriction Report

Restriction Category	Restriction Detail	Reason Category	Qty of Restr	Weight	CC's Affected	CHI Score	Action	Owner	Relief Date
HDA Restriction	Disty and SBS with no top cover damper for cost save	Customer Unique Requirement	0	7	0	0	Top cover damper not on Disty and SBS for cost savings	NA	NA
HDA Restriction	Disty and SBS with no top cover damper for cost save	To Meet Customer Quality Requirements	0	7	12	0	Top cover damper not on Disty and SBS for cost savings	NA	NA
PCBA Restriction	Disty and SBS with non-LH PCBAs for cost save	Implement Cost Savings	0	3	12	0	Non-LH PCBA for cost savings on Disty and SBS	NA	NA
PCBA Restriction		Customer Unique Requirement	0	3	0	0		NA	NA
PCBA Restriction		To Meet Customer Quality Requirements	0	3	0	0		NA	NA
PCBA Restriction		Customer Unique Requirement	0	3	0	0		NA	NA
PCBA Restriction		Customer Unique Requirement	0	3	0	0		NA	NA
Test Screen Restriction	Apple requires Blue Nun test	Customer Unique Requirement	1	3	12	36	None	NA	NA
Test Screen Restriction	Apple require full pack zero pattern format	Customer Unique Requirement	1	3	12	36	None	NA	NA
Test Screen Restriction	HP 20M Zeros 1st and last	Customer Unique Requirement	1	3	6	18	None	NA	NA
Top Cover Restriction		Customer Unique Requirement	0	7	0	0		NA	NA
Test Screen Restriction		Customer Unique Requirement	0	3	0	0		NA	NA
	Total Active CCs	54	Complexity Health Index			90			
	Total CCs affected	54	Complexity Health Ratio			1.67			
	Unrestricted CCs	0							
	Total Restrictions	3							
	Closed Restrictions	0							
	Restrictions with closure plan	0							
	Restrictions that require closure plan	0							
	Non-Closeable due to Customer/Marketing Requirement	3							
	Non-Closeable due to Cost Savings / Other	0							



# Change log

Changes from Phase 0:

7April 2011

Changes from Gen1

Reduced CCs from 80 to 54 by rolling FTS, Sony and Dell into Std OEM

Removed cover damper and non-LH restrictions

